PB89-196760

Superfund Record of Decision (EPA Region 2)
Ewan Property, Burlington County, New Jersey
(First Remedial Action), September 1988

(U.S.) Environmental Protection Agency, Washington, DC

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U.S. Department of Commerce
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Agency

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Remedial Response

EPA/ROD/R02-88/073
September 1988

PB89-196760

EPA

Superfund Record of Decision:

Ewan Property, NJ

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Ewan Property, NJ
First Remedial Action

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Washington, D.C. 20460

13. Type of Report & Period Covered
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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 43-acre Ewan Property site is located in a predominantly agricultural and residential area of Shamong Township, Burlington County, New Jersey. Private residences are provided domestic water from wells as close as one mile downgradient from the site, drawing from an aquifer that extends from beneath the site. The site is broken into two study areas, Area A and Area B. Area A, consisting of nine acres, is the area of concern. Site investigations revealed that during the early to mid-1970s, at least 500 to 8,000 55-gallon drums containing hazardous industrial wastes were disposed of in trenches in Area A, and the trenches were subsequently backfilled with soil. Investigations also revealed that many of the drums are ruptured, corroded or leaking. Soil and ground water samples indicate the presence of VOCs and metals. It is estimated that Area A has 4,500 yd^3 of highly contaminated soil and waste material, and 29,500 yd^3 of moderately contaminated soil. Primary contaminants of concern affecting soil and ground water are VOCs such as benzene, TCE, PCE, and xylenes, and metals including chromium and lead.

The selected remedial action for this site includes: construction of decontamination, staging and waste characterization areas; excavation, staging and characterization of (See Attached Sheet)

17. Document Analysis a. Descriptors
Record of Decision
Ewan Property, NJ
First Remedial Action
Contaminated Media: gw, soil
Key Contaminants: metals (chromium, lead), VOCs (benzene, PCE, TCE, xylenes)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement

19. Security Class (This Report) None

20. Security Class (This Page) None

21. No. of Pages 111

22. Price / MF
PC$21.95/$6.95

(See ANSI-Z39.18)

See Instructions on Reverse

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EPA/ROD/R02-88/073
an Property, NJ
First Remedial Action

16. ABSTRACT (continued)

waste materials with offsite incineration of all appropriate wastes (approximately 4,500 yd^3 of buried drums and heavily contaminated soil); temporary onsite storage and assessment of non-incinerable wastes to determine proper disposal method; and monitoring of air and ground water during remedial activities. The estimated present worth cost of the selected remedy is $21,153,000 with estimated annual O&M costs of $22,000.

DECLARATION STATEMENT

RECORD OF DECISION

Ewan Property

SITE NAME AND LOCATION

Ewan Property, Shamong Township, Burlington County, New Jersey

STATEMENT OF PURPOSE

This decision document presents the selected remedial action for addressing the source of contamination at the Ewan Property site, developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent applicable, the National Oil and Hazardous Substances Pollution Contingency Plan.

The State of New Jersey concurs with the selected remedy.

STATEMENT OF BASIS

I am basing my decision primarily on the following documents, which are contained in the administrative record, and which characterize the nature and extent of contamination and evaluate long-term remedial alternatives for the Ewan Property site:

- Final Remedial Investigation Report, Ewan Property, prepared by Ebasco Services and NUS Corporation, June 1988;

- Final Feasibility Study Report, Ewan Property, Operable Unit One, prepared by Ebasco Services and NUS Corporation, July 1988;

- Proposed Remedial Action Plan, Ewan Property, Operable Unit One, August 1988;

- The attached Decision Summary for the Ewan Property site;

- The attached Responsiveness Summary for the Ewan Property site, which incorporates public comments received; and

- Staff summaries and recommendations.

DESCRIPTION OF SELECTED REMEDY

The remedial alternative presented in this document represents the first operable unit of a final remedial solution for the Ewan Property site. It addresses the contaminant source materials at the site and includes the excavation and disposal, primarily via incineration, of approximately 4500 cubic yards of buried drums and heavily contaminated soil. The ground water contamination in the underlying aquifer and the lesser contaminated soils will be addressed as part of a second operable unit following the completion of additional studies and a second ROD. The specific components of the remedial action are as follows:

- Clearing of the waste disposal area and upgrading of site roadways;
- Construction of decontamination, staging and characterization areas;
- Excavation, staging and characterization of source materials;
- Transportation of wastes which are appropriate for thermal destruction to a permitted off-site thermal destruction facility;
- Additional assessment of wastes which are not appropriate for thermal destruction to determine the appropriate methods of waste management; and
- Monitoring of air and groundwater during remedial activities.

DECLARATIONS

Consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300, I have determined that the selected remedy is protective of human health and the environment, attains federal and state requirements that are applicable or relevant and appropriate for this remedial action, and is cost-effective. Furthermore, this remedy satisfies the preference for treatment that reduces mobility, toxicity, or volume as a principal element. Finally, I have determined that this remedy utilizes permanent solutions and alternate treatment technologies to the maximum extent practicable.

9-29-88
Date

William J. Muszynski, P.E.
Acting Regional Administrator

Decision Summary for Operable Unit One
Ewan Property Site
Shamong Township, New Jersey

SITE DESCRIPTION

The Ewan Property site is located in Shamong Township, Burlington County, New Jersey, approximately 5,000 feet east-northeast of Indian Mills Lake and an estimated 4,000 feet south of Tuckerton Road. Figure 1 illustrates the location of Ewan Property relative to Indian Mills Lake and Tuckerton Road. Wharton State Forest is approximately two miles south of the site. The Ewan Property is situated in the northwest corner of the New Jersey Pinelands and appears to border both the Pinelands Agricultural and Protection Areas.

The Ewan Property is an approximate 43 acre tract of land identified on Shamong Township tax maps as block 23, lots 32 and 32A. Currently, the property is privately owned by Mrs. Verna Dale Donnelly (formerly Mrs. Verna Dale Ewan) of Willingboro, New Jersey. Figure 2 identifies both the Ewan Property and adjacent tax parcels.

Land use within 1.25 miles of the site is generally agricultural and single family residential developments. Figure 3 displays the land uses and classifications surrounding the Ewan Property in June 1983. Areas immediately northeast of the site are being developed to accommodate middle to upper-middle income single family residential units.

Domestic water within one mile of the site is obtained from individual private wells developed within the Cohansey Sand hydrogeologic unit, a water table aquifer. Domestic sewerage is disposed of via individual private septic systems. Area agricultural water usage is dependent upon the water table aquifer. Ground water within the Cohansey Sand has been determined to flow in a southerly direction. The nearest identified domestic ground water user down-gradient of the site is located approximately one mile away.

Two aquifers were investigated beneath the site. The upper or water table aquifer is the Cohansey Sand hydrogeologic formation. The ground water velocity within the Cohansey Sand aquifer was estimated to be 50 to 124 feet per year. The Cohansey Sand aquifer demonstrated a slight downward vertical gradient into the underlying Kirkwood Formation, the lower aquifer. Both aquifers demonstrated hydraulic linkage and a southerly flow. No aquitards were identified within the investigated area.

A small unnamed, intermittent tributary of Springers Brook is identified as proceeding in a general northeast to southwest direction across the Ewan Property.

The nearest surface water body is located on the Ewan Property itself. It is a small farm pond south of tax block 23, lot 32A (see Figure 2).

SITE HISTORY

For purposes of the Remedial Investigation (RI), two study areas were originally identified on the Ewan Property. They are known as Areas A and B (see Figure 2).

Area A is a nine acre parcel located in the southern portion of tax block 23, lot 32. The RI studies revealed that hundreds of drums containing hazardous substances and other industrial contaminants were disposed of in trenches in Area A. EPA believes that the disposal of these drums occurred during the early and mid-1970's. After such disposal, the trenches were apparently backfilled, thereby burying the drums containing hazardous substances, and the surface soils were later recontoured.

The RI investigations also revealed the following information, among others, concerning the conditions which presently exist at Area A:

1. At least 500 to 8000 55-gallon drums containing hazardous substances (HSs) and/or industrial contaminants are buried in the soil at Area A;

2. Many of the drums buried at Area A are ruptured, corroded and/or are otherwise in a state of disintegration;

3. HSs have been released into the soil and ground water at Area A from many of the buried drums which were found at this location;

4. HSs have migrated from the drums at Area A into the Cohansey Sand aquifer which exists under the Ewan Property;

5. A contaminant plume containing HSs exists in the Cohansey Sand aquifer under Area A and this plume has and will continue to migrate in a southerly direction away from Area A (see Figure 5);

6. Approximately 4500 cubic yards of soils and drums and contents which are heavily contaminated with HSs and other industrial contaminants exist at Area A;

7. Approximately 29,500 cubic yards of soils which are moderately contaminated with HSs and other industrial contaminants exists at Area A; and

8. HSs contained in the buried drums and in the contaminated soils discovered at Area A have and will probably continue to migrate into the Cohansey Sand aquifer under the Ewan Property.

The RI has concluded that Area B is not of concern. Each magnetic anomaly or soil gas detection within Area B was investigated. Buried domestic trash was encountered at most of these locations. Also, no ground water contamination was detected within Area B. Therefore, Area B will not be considered for either operable unit one or operable unit two remedial actions. Figure 4 outlines the approximate extent of contamination in Area A.

The Ewan Property site was originally proposed for inclusion on the National Priorities List (NPL) in March 1985. The site was formally added to the NPL in June 1986.

REMEDIAL ACTIONS BY EPA

The Environmental Protection Agency (EPA) performs Remedial Actions at toxic waste sites in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (P.L. 96-510: CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (P.L. 99-499: SARA). These Remedial Actions are primarily planned and conducted in the following sequence:

The first phase consists of performing a site-specific remedial investigation and feasibility study (RI/FS). The RI is implemented to define the nature and extent of contamination. The FS evaluates technologies and alternatives which will be developed and implemented to remediate the contamination identified in the RI.

Following the completion of the RI/FS, a Record of Decision (ROD) is signed by the EPA. This is the Agency's offical document which selects a remedy for the site and provides the rationale for the selected remedy.

Following the signing of a ROD, the Remedial Design (RD) is initiated. During the RD, plans and specifications are developed to be utilized during the remediation phase, also referred to as the Remedial Action (RA). The RA is the actual implementation of the site cleanup.

Pre-Remedial Investigation Activities*

In 1983, the New Jersey Department of Environmental Protection (NJDEP) conducted an electromagnetic conductivity survey and installed five monitoring wells in the Cohansey Sand aquifer within Area A. Figure 6 illustrates the location of these wells (see EP-1 through EP-5). Sample results from these wells indicated the presence of the following organic and inorganic contaminants: methylene chloride, toluene, chloroform, 2,4-dichlorophenol, n-butylbenzene, o-dichlorobenzene, p-dichlorobenzene, 1,2,4-trichlorobenzene, arsenic, chromium, and lead.

NJDEP further characterized the site by conducting bulk sampling of one drum and an investigation of waste spillage onto soil at three other locations. Table 2 illustrates the constituents of these four samples which includes chemical species found in the ground water sampling as well as the following: tetrachloroethane, benzene, xylenes, 1,2-dichloroethane, 1,1-dichloroethane, napthalene, phenanthrene/anthracene, pyrene, acenaphthylene, benzo(a)anthracene/chrysene, hexachlorobutadiene, styrene, 1,2,4 trimethylbenzene, 1,3,5-trimethylbenzene, phenol, 4-nitrophenol, sec-butylbenezene, 4-chlorophenyl phenyl ether, o-chlorotoluene, n-propylbenzene, bis(2-ethylhexyl) phthalate, di-n-butylphthalate, diethylphthalate, antimony, cadmium, copper, mercury, nickel, selenium, silver, and zinc.

The subsequent RI activities confirmed the presence of these and other contaminants.

EPA Remedial Investigation Activities

Pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan, EPA commenced field activities at Areas A and B of the Ewan Property site in 1985.

The RI activities conducted to evaluate the nature and extent of contamination on or near the site included: visual observation, direction by confidential sources familiar with the Ewan disposal operation, geophysical surveys, soil gas screening, test pits, soil borings, surface and sediment sampling and analysis, health and safety monitoring, domestic well sampling and analysis, and monitoring well installation, sampling and analysis.

Figure 6 displays all of the sampling locations (except domestic well, surface water and sediment sampling locations) that were utilized during the RI. Provided below is a chronology of remedial investigation activities for the Ewan Property.

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* Specific Target Compound List (TCL) analysis is available in the RI report. A brief summary of the TCL detections are listed on Table 1.

NJDEP pre-RI activities	9/83 - 10/83
EPA pre-RI activities	4/84 - 9/84
EPA RI activities (NUS)	10/85 - 10/86
EPA RI activities (EBASCO)	10/86 - present

Preliminary Surveys

EPA conducted a series of preliminary field surveys to refine the areas of the Ewan Property which would be scrutinized during the RI. These surveys included soil gas screening and geophysical surveys (total magnetic field intensity surveys, magnetic gradient surveys, and electromagnetic surveys). The soil gas surveys were implemented to identify areas of organic compound volatilization. The geophysical surveys were utilized to isolate areas containing buried ferromagnetic objects or magnetic anomalies.

The summary of these preliminary surveys provided the basis by which the subsequent investigative activities, including the sampling and analysis of the soil and ground water, were performed.

Test Pits*

Following the preliminary surveys, the locations of sixteen test pits were identified. The test pits were used to confirm the accuracy of waste location estimates produced from the preliminary surveys and a party familiar with the disposal operation. The primary goals of the test pitting operation were to: determine if industrial waste was present in Area B; examine the condition of the buried drums; estimate the depth of waste burial; obtain subsurface soil, ground water, and drum samples; and determine if bulk uncontainerized disposal occurred in Area A. Figure 6 illustrates test pits 1 through 7 which were excavated in Area B, and displays test pits 8 through 16 which were dug in Area A.

The test pit field logs indicated that either nothing noteable, or bog iron, or domestic trash was discovered in the Area B test pits. The TCL (Target Compound List) analysis of Area B test pits did not indicate industrial waste disposal.

Conversely, test pits 10, 11, 13, 15, and 16 revealed drums in various physical conditions or contained gases at explosive limits. The predominant chemical species detected during Area A test pit sampling were xylenes and 2-methylnapthalene. Drums were encountered from the ground surface to approximately 11 feet below grade. Most often, drums were encountered at about 1.5 feet below grade.

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* Specific TCL analysis is available in the RI report. A brief summary of the TCL detections are listed on Table 1.

In addition to the Area A test pit soil and ground water sampling, NUS collected two samples of liquids which apparently spilled from drums. These two bulk samples differed slightly from the July 1983 NJDEP samples in that the only TCL chemicals detected were methylene chloride, tetrachloroethene, xylenes, and ethylbenzene.

Soil Sampling*

The Ewan Property soil sampling program was designed to define the nature as well as the vertical and horizontal extent of contamination. Both field screening and laboratory analysis were performed on the soil samples. Twenty percent of the soil samples that detected TCL constituents in the field screening were analyzed in a certified laboratory. A total of 56 soil samples were collected and field screened for volatile organics; 47 soil samples were sent to a certified laboratory for TCL analysis.

Figure 6 illustrates the soil sampling locations in Area B and background areas. Two soil borings, EP-SO-001 and EP-SO-002, demonstrated low concentrations of 1,1,1-trichloroethane at 6.1 micrograms per kilogram (ug/kg), 14.0 ug/kg, 55.0 ug/kg, and 72 ug/kg. These detections were determined not to be indicative of the industrial waste disposal evident in Area A.

Figure 6 illustrates the Area A soil boring locations. Inorganic compounds detected in Area A included lead, cyanide, tin, barium and chromium. The organic chemical species detected in area soil borings were acetone, methylethyl ketone, methyl isobutyl ketone, toluene, ethylbenzene, xylenes, tetrachloroethene, trichloroethene, methylene chloride, acenphthene, 2-methylnapthalene, phenanthrene, bis(2-ethylhexyl)phthalate, di-n-butylphthalate, butyl benzyl phthalate, anthracene, fluorene, fluoranthene, and dibenzofuran.

Ground Water: Domestic Wells*

Figure 7 illustrates the approximate locations of the domestic wells sampled during the RI. Of the eleven domestic wells sampled, two wells demonstrated estimated benzene concentrations of 1 ug/l (microgram per liter). These wells were located south and west of the site. The RI indicated that no direct correlation can be made between the site and these two wells. Under the Federal Safe Drinking Water Act, a Maximum Contaminant Level for benzene was established at 5 ug/l. Copper was estimated to be 1.17 milligrams per liter (mg/l) in one domestic well south of the site. This value exceeds the National Drinking Water Secondary Standard of 1 mg/l. The RI does not attribute this copper concentration to the site but does indicate that the acidic ground water may be leaching the metallic plumbing at this domestic well. No domestic wells have demonstrated contamination that is associated with the Ewan Property site.

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* Specific TCL analysis is available in the RI report. A brief summary of the TCL detections are listed on Table 1.

Ground Water: Monitoring Wells*

Figure 5 illustrates the approximate extent of the contaminated ground water plume. The contaminated ground water plume has been estimated to be approximately 500 feet long, 600 feet wide and 30 feet below grade. This indicates that the upper portion of the Cohansey Sand aquifer is contaminated. However, the results indicate that the contaminated ground water has not migrated into the underlying Kirkwood Formation aquifer. Major contaminants of concern identified in the ground water are xylenes, toluene, benzene, methylethyl ketone, 1,2-dichloroethane, acetone, 4-methylphenol, ethylbenzene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, acenaphthene, napthalene, 2-methylnapthalene, lead, and cyanide. EPA will collect several monitoring and domestic well samples for analysis to further define the ground water contamination for Operable Unit Two.

Ground water within the study areas demonstrated a southerly flow. The horizontal hydraulic gradient of the Cohansey aquifer across the study areas was determined to be a 2 foot vertical water table decline over a 1000 foot distance (0.002 vertical feet/horizontal foot). Applying this and other hydrogeologic data to actual site conditions, it was determined that the actual ground water flow in the Cohansey Sand aquifer below the site to be from 50 to 124 feet/year.

Surface Water*

Three surface water samples were taken outside of Area A as part of the surface water sampling program. Figure 8 displays the surface water sampling locations. All three surface water samples were taken up-gradient of Area A in standing water. None of the surface water samples demonstrated contaminant concentrations that were indicative of industrial waste disposal.

Sediment*

Seven sediment samples were taken in the unnamed tributary of Springers Brook. These samples were up-gradient and side-gradient to Area A. Figure 8 displays the sediment sampling locations used for this program. None of the sediment samples demonstrated contaminant concentrations that were indicative of industrial waste disposal.

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* Specific TCL analysis is available in the RI report. A brief summary of the TCL detections are listed on Table 1.

Ambient Air

At present, the site is in an undisturbed state. EBASCO determined that, in the present condition of the site, no detectable concentrations of volatilizing chemicals were encountered.

Radiation

During the RI activities, no detectable ionizing radiation was encountered.

Public Health and Environmental Concerns

Due to local environmental conditions, including geography, geology and hydrology, EPA has concluded that few contaminant pathways exist for contamination associated with the Ewan site. The primary pathways of concern are surface and subsurface soils, and ground water. As described in the previous section, local site features are conducive to the leaching of contaminants from the disposal area into the nearby ground water. The major potential route of exposure is through domestic use (drinking, showering) of ground water.

As described in the RI report, 21 indicator chemicals were selected in accordance with the Superfund Public Health Evaluation Manual on the basis of toxicity, persistence, mobility, and concentration. The list of indicator chemicals includes:

Volatile Organics

2-butanone, 1,2-dichloroethane, 4-methyl-2-pentanone, 1,1,1-trichlorethane, benzene, trichloroethene, ethylbenzene tetrachloroethene, toluene, carbon tetrachloride, total xylenes, 1,1-dichloroethene, methylene chloride, and chloroform.

Semi-volatile Organics

bis(2-ethylhexyl)phthalate, naphthalene, and 2-methylnaphthalene

Inorganics

lead, chromium, barium, and copper

For risk assessment purposes, individual contaminants were separated into two categories of chemical toxicity depending upon whether they cause carcinogenic or non-carcinogenic effects. In the case of chemicals exhibiting carcinogenic effects, exposures and associated risks are expressed in exponential terms: $1x10^{-4}$ (one in ten thousand), $1x10^{-7}$ (one in ten million), etc. EPA has used a range of $1x10^{-4}$ to $1x10^{-7}$ in evaluating

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* Specific TCL analysis is available in the RI report. A brief summary of the TCL detections are listed on Table 1.

risk assessment decisions. The level of 1x10-6 (one in a million) has often been used by regulatory agencies as a bench mark. In the case of chemicals exhibiting non-carcinogenic effects, exposures and associated risks are expressed as a ratio. This ratio, which is referred to as the Hazard Index, is calculated by dividing a potential predicted quantity of a chemical that a person could be exposed to, divided by the amount of that chemical that an individual can be exposed to without being subject to any adverse health effects. A hazard index less than one indicates that no adverse health affects are expected.

Table 3 shows risks and hazard indices associated with organic contaminants and Table 4 shows risks associated with inorganic contaminants detected in the ground water at the Ewan site. These values represent potential future risks that would be associated with the migration of contaminated ground water to the site boundary (92 meters) and the nearest off-site presently existing drinking water well (920 meters). Currently, the EPA has not identified any residents who are using the contaminated ground water.

The public health and environmental assessment for the Ewan site indicates that there are no current threats to the public health or local wildlife populations. Table 5 summarizes potential future impacts to potable ground water supplies. The second operable unit for this site will incorporate these findings in order to fully address future ground water remediation.

EPA ENFORCEMENT ACTIVITIES

EPA conducted an investigation to identify potentially responsible parties for the Ewan Property site. Under Section 107 of CERCLA, as amended, responsible parties may include owners or operators of sites as well as parties who generated the hazardous substance at the site or were involved in the transport, treatment or disposal of them. As a result of EPA's investigation, six potentially responsible parties were notified of their potential liability under Section 107 of CERCLA, as amended by SARA. One of the six parties has expressed a willingness to participate in the corrective action for the site and may enter negotiations with EPA in the near future to perform the first operable unit for remediation of the site.

EPA also intends to notify other potentially responsible parties of their potential liability with respect to the selected remedy described in the ROD. In the event that potentially responsible parties do not voluntarily agree to perform or finance the cleanup, EPA is prepared to perform the first operable unit remedial action using CERCLA funds and may use its enforcement authority to recover its response costs from any or all of the potentially responsible parties which have been identified to date.

COMMUNITY RELATIONS

A Community Relations Plan for the Ewan Property was finalized in April 1985. This document lists contacts and interested parties throughout the government and local community. It also establishes communication pathways to ensure timely dissemination of pertinent information.

EBASCO finalized the work plan for the RI/FS in December 1987 and placed this document at one local information repository established for the site. A public meeting was held in May 1986 to discuss the work plan and to inform the public about the Superfund program and the history and status of the site.

Upon completion of the RI, and the FS and Proposed Remedial Action Plan (PRAP) for the first operable unit, EPA disseminated these documents to the local repository. Public notices were mailed out to local residents and officals on July 31, 1988 indicating the initiation of the public comment period. The public comment period extended until September 12, 1988. During this period, a public meeting was held on August 18, 1988 to discuss the RI, Operable Unit One FS, and the Operable Unit One PRAP.

SCOPE AND ROLE OF OPERABLE UNIT ONE

The scope of the first operable unit remedial action at the Ewan Property will address the buried drums and heavily contaminated materials (source materials). EBASCO has estimated the volume of the source materials to be a maximum of 4,500 CY. This operable unit is an interim remedy designed to control a majority of the source materials. It is not the intention of this first operable unit to remediate the site to chemical specific concentrations which would allow the site to be deleted from the NPL. Although the source material will be mitigated during the initial phase of the remediation, the remaining site contaminants would continue to pose a threat to the underlying aquifer which is classified as GW-1. EBASCO has further estimated that an additional 29,500 CY of lesser contaminated soils exist at the site. These lesser contaminated soils and the contaminated ground water plume will be remediated during a subsequent operable unit.

FEASIBILITY STUDY

This FS was developed for the first operable unit of remediation at the Ewan Property site. The subsequent FS will address the remediation of the lesser contaminated soils and ground water.

This section of the ROD describes the remedial alternatives that were developed utilizing suitable remedial technologies which are required by SARA. The candidate remedial technologies (thermal destruction, solidification/fixation, excavation and removal, and encapsulation) were screened based upon their applicability to site-specific circumstances, ability to reduce contaminant mobility, toxicity or volume, general effectiveness, and technical and administrative feasibility. The containment option was shown not to be effective due to the site geology.

The remedial alternatives developed were created from those remedial technologies which survived the preliminary screening. SARA mandates that, to the fullest extent practicable, EPA choose remedial alternatives that utilize permanent solutions and treatment as the principal element. The contaminants detected in the bulk, soil and ground water media indicate that the source materials are largely organic which are appropriate for thermal destruction. Therefore, the three formulated remedial alternatives are:

Remedial Alternative 1:	No Action
Remedial Alternative 2:	Excavation and Off-Site Thermal Destruction of the Waste and/or Treatment of the Waste
Remedial Alternative 3:	Excavation and On-Site Thermal Destruction of the Waste and/or Treatment of the Waste

Description of Remedial Alternatives

Three remedial alternatives were evaluated for the first operable unit of the Ewan Property site remedial action. These remedial alternatives are described below:

Remedial Alternative 1: No Action

The No Action remedial alternative would require the coordination of the EPA, NJDEP, and local authorities to reduce public and environmental impacts posed by the site contamination.

Specific site related activities would include quarterly ground water sampling and analysis of site monitoring wells for the first year of implementation. In the following years, ground water sampling frequency would be reduced to semi-annual events. For each successive five year period, new monitoring wells would be installed down-gradient of the contaminated ground water plume. Each five year period after commencement would allow EPA the opportunity to re-evaluate the No Action alternative. After approximately fifteen years of initiation, domestic wells south of Area A will be included in the sampling program. This sampling would continue indefinitely. The program would be designed to predict and quantify the ground water contaminant plume. As domestic wells become contaminated, further studies would be conducted to determine programs by which the residents could be supplied with alternate potable water.

Area A would be permanently isolated via security fences and alarms. This area would definitely be "off limits" to unauthorized personnel for an indefinite period. Regular security patrols would inspect the area to protect it from damage or trespassers.

Area A and the properties south of Area A would have deed and ground water usage restrictions placed upon them. As the contaminated ground water plume approached domestic wells, ground water usage would be stopped. Development over the existing or predicted ground water plume may need to be restricted.

Remedial Alternative 2: Excavation and Off-Site Thermal Destruction of Waste and/or Treatment of Waste

Based upon chemical data illustrated in the RI, thermal destruction of the source material appears to provide adequate remedial results. EBASCO has determined that the organic contaminants detected at the Ewan Property are appropriate for thermal destruction. The overall EPA approach to remediating the Ewan Property is to remove the source of contamination during Operable Unit One, then mitigate the lesser contaminated soils and ground water during Operable Unit Two. As previously stated, the source materials are the 4,500 CY of drummed, bulk waste and heavily contaminated materials within Area A.

The initial phase of Remedial Alternative 2 is to provide security for Area A. This would be created by the installation of a standard security fence around Area A. A portion of land would be prepared for decontamination, and temporary waste storage and characterization. The unpaved roadway between Tuckerton Road and Area A would be upgraded to accommodate heavy vehicle traffic. Area A would be cleared of vegetation.

Once the storage/characterization area, security fence, decontamination area, and roadways are completed, the excavation of the buried waste in Area A will commence. Various excavation equipment will be used to extract the randomly oriented drums and waste. Continuous air monitoring will be conducted within the excavation area and at the perimeter of the Area A security fence. If the air monitoring program indicates concern, a contingency plan will be enacted to protect the public and environment. The air monitoring program will also be used to determine the most effective protection for the remedial workers. A contingency plan would also be enacted if spillage from excavated waste were to occur. Heavily contaminated materials surrounding the waste will also be excavated and stored on-site prior to potential off-site disposal.

The waste would then be transported to the finished storage/characterization area. At this point, the waste would be sampled for characterization parameters. Waste which is determined to be appropriate for thermal destruction will be segregated from waste which is not appropriate for thermal destruction.

The waste which is appropriate for thermal destruction will be loaded onto trucks and transported to a licensed off-site thermal destruction facility. Waste which is not appropriate for thermal destruction will be analyzed and stored on-site until the most appropriate disposal or treatment method is identified and enacted.

The capacity of off-site thermal destruction units remains a limiting factor for implementation of this remedial alternative. Delays may be encountered in transporting the material to an off-site thermal destruction facility if sufficient capacity does not exist.

Those materials which do not demonstrate heavy contamination and contaminated ground water will not be remediated under this phase of cleanup. EBASCO has determined that the contaminants detected in the bulk materials, soil and ground water will be appropriate for thermal destruction. However, it is possible that a small fraction of the source material would not be appropriate for thermal destruction. Those materials will be addressed via the most appropriate treatment or disposal method identified.

Remedial Alternative 3: Excavation and On-Site Thermal Destruction of Waste and/or Treatment of Waste

This alternative is similar to Remedial Alternative 2, in that the buried waste and heavily contaminated materials will be excavated and stored on-site for characterization. The conceptual plans are further explained in the description of Remedial Alternative 2.

The exception to Remedial Alternative 2 is that a separate area must be developed for the on-site thermal destruction unit. The on-site thermal destruction unit itself would be installed on-site in a secured area of the site. This thermal destruction unit will be fitted with "state-of-the-art" air pollution and combustion control equipment. The emissions from the thermal destruction unit will be constantly monitored. Waste which is characterized as not appropriate for thermal destruction will be further analyzed to determine the most appropriate disposal or treatment method (see Remedial Alternative 2).

Limitations for this remedial alternative include mobile thermal destruction unit availability, EPA/NJDEP approval, and community acceptance.

Those materials which do not demonstrate heavy contamination and contaminated ground water will not be mitigated until the conclusion of the remedial action for Operable Unit Two. Ground water monitoring will continue until the conclusion of Operable Unit Two.

First Operable Unit Remedial Alternative Evaluation

Nine criteria were utilized to evaluate the three remedial alternatives for the first operable unit. Listed below are the nine criteria and a brief explanation of each:

- Overall Protection of Human Health and the Environment: This criterion addresses whether or not a remedy provides adequate protection and describes how risks are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

  Remedial Alternative 1: No action provides limited protection of the public and the environment by indicating the movement of the ground water contaminant plume. This remedial alternative does not address mitigation of the source or the ground water.

  Remedial Alternatives 2 and 3: Both Excavation and Off-Site and On-Site Thermal Destruction of Waste and/or Treatment of Waste address the ultimate treatment of the source materials. During the operation of either remedial alternative, site perimeter air monitoring and ground water monitoring would be performed. If volatilization, spillage, or emissions indicates concern, contingency plans would be implemented. Alternative 3 will incorporate extensive thermal destruction unit emissions monitoring.

- Compliance with Applicable or Relevant and Appropriate Requirements of Federal and State of New Jersey Regulations: This criterion addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other environmental statutes and/or provide grounds for invoking a waiver.

  Both Excavation and Off-Site and On-Site Thermal Destruction of Waste and/or Treatment of Waste do not address the final site concentrations which will be required to delete the site from the National Priorities List. Therefore, all contaminant specific ARARs would not be attained until the second phase of the remedial action is completed. This second operable unit will remediate the site to specific ARAR concentrations. ARARs specific to enactment of the source control action will be complied with during all phases.

- Long-term Effectiveness and Permanence: This criterion refers to the ability of the remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

Remedial Alternative 1: No Action does not remediate the site to a condition where the source is effectively removed or treated.

Remedial Alternatives 2 and 3: Both Excavation and Off-Site and On-Site Thermal Destruction and/or Treatment of Waste would contribute significantly to the long-term effectiveness and permanence that will ultimately be achieved by the final remedy for the Ewan Property, in that the potential hazard to be managed is dramatically reduced.

- Reduction of Mobility, Toxicity and/or Volume (MTV): This criterion addresses the anticipated performance of the treatment technologies that a remedy may employ.

Remedial Alternative 1: No Action does not address the reduction of MTV.

Remedial Alternatives 2 and 3: Both Excavation and Off-Site and On-Site Thermal Destruction of Waste and/or Treatment of Waste reduce MTV via thermal destruction of the organic content of the source.

- Short-term Effectiveness: This criterion involves the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

Remedial Alternative 1: No Action achieves short-term protection only through monitoring of the contaminated ground water and enactment of local administrative controls.

Remedial Alternatives 2 and 3: Both Excavation and Off-Site and On-Site Thermal Destruction of Waste and/or Treatment of Waste provide for site perimeter air monitoring and ground water monitoring. If either program indicates concern, contingency plans will be implemented to protect both the public and the environment. Remedial Alternative 2 will attempt to minimize impacts caused by off-site transport of waste and does not present the potential impacts associated with the on-site thermal destruction unit of Remedial Alternative 3. Also, Remedial Alternative 2 can be employed more expeditiously than Remedial Alternative 3. As a result, the potential impacts of Remedial Alternative 2 will be present for a shorter period of time. Remedial Alternative 3 will incorporate thermal destruction unit emissions monitoring.

- Implementability: This criterion examines the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the chosen solution.

Remedial Alternative 1: No Action is technically feasible through the use of present analytical monitoring procedures and the development of local administrative jurisdictions implementing deed and water well restrictions.

Remedial Alternatives 2 and 3: Both Excavation and Off-Site and On-Site Thermal Destruction of Waste and/or Treatment of Waste are implementable based upon tried and proven examples at other hazardous waste sites.

- Cost: This criterion includes capital and operation and maintenance costs. Table 6 provides a summary of the three remedial alternatives.

Remedial Alternative 1: No Action is the least expensive of the three remedial alternatives evaluated. Costs for this alternative are related to monitoring of the ground water contamination. The annual monitoring costs are $22,000 per year for an indefinite period, creating a present worth cost of $353,000.

Remedial Alternative 2: Excavation and Off-Site Thermal Destruction of Waste and/or Treatment of Waste involves a capital cost of $20,800,000. The ground water monitoring costs which are expected until completion of the final phase of remedial action are $22,000 per year, creating a present worth cost of $21,153,000.

Remedial Alternative 3: Excavation and On-Site Thermal Destruction of Waste and/or Treatment of Waste involves a capital cost of $18,964,000. As with the previous two remedial alternatives, the ground water monitoring will continue until the completion of the final phase of remedial action for $22,000 per year, creating a present worth cost of $19,317,000.

- State Acceptance: This criterion indicates whether, based on its review of the RI/FS and the Proposed Plan, the State concurs with, opposes, or has no comment on the preferred alternative.

Remedial Alternative 1: Based upon EPA and NJDEP discussions, No Action is the least favored remedial alternative.

Remedial Alternatives 2 and 3: Excavation and Off-Site and On-Site Thermal Destruction of Waste and/or Treatment of Waste were considered by EPA and NJDEP as the most favorable alternatives for the destruction of the organic materials anticipated at the Ewan Property.

- Community Acceptance: This criterion indicates whether, based upon its review of the RI/FS and the Proposed Plan, the community concurs with, opposes, or has no comment on the selected remedy.

Remedial Alternative 1: The community demonstrated opposition to the No Action alternative.

Remedial Alternative 2: Excavation and Off-Site Thermal Destruction of Waste and/or Treatment of Waste was widely accepted by the community.

Remedial Alternative 3: The community demonstrated opposition to the Excavation and On-Site Thermal Destruction of Waste and/or Treatment of Waste.

EPA considered the No Action alternative as the least favored alternative. It is EPA's judgement that No Action does not provide adequate protection of public health or the environment and, therefore, does not fulfill the requirements set forth in SARA.

Remedial Alternatives 2 and 3 were considered to be equally protective of the public and the environment. These two alternatives differed somewhat in remedial implementation costs. An approximate $1.5 million difference exists when comparing incineration of the estimated maximum source volume of 4,500 cubic yards. The Shamong Township community presented verbal endorsement of the selection of off-site thermal destruction.

The following section pertains to the specific evaluation of the selected remedial alternative.

THE SELECTED REMEDY FOR OPERABLE UNIT ONE

After careful review and evaluation of the remedial alternatives presented in the feasibility study, EPA presented Remedial Alternative 2, Excavation and Off-Site Thermal Destruction of Waste and/or Treatment of Waste, to the public as the preferred remedy for the first phase of remedial action at the Ewan Property site.

EPA has determined that mitigation of the source is necessary prior to attempting to remediate the contaminated ground water. The data in the RI suggests that the majority of the source materials and heavily contaminated materials are appropriate for thermal destruction. SARA prefers the utilization of permanent remedies wherever possible. Thermal destruction is a proven remedial treatment which is considered a permanent remedy.

The input received during the public comment period, consisting primarily of questions and statements transmitted at the public meeting held August 18, 1988, and Chrysler Corporation comments of September 12, 1988, are presented in the attached Responsiveness Summary. The public and Chrysler Corporation comments were generally in agreement with EPA's preferred remedial approach. Accordingly, the preferred alternative was selected by EPA as the selected remedy for Operable Unit One.

The costs associated with the implementation of the selected remedy are summarized on Table 7. The specific cost itemization is located in the Final FS report, Appendix A. The four major components of the selected remedy are listed as follows:

- Site Preparation

  Costs associated with the site preparation include: upgrading of roadways within the Ewan Property to allow for heavy vehicle access; clearing of vegetation within Area A; construction of the staging/characterization/storage and decontamination areas; and security fence installation. The cost for this item of the selected remedy is $875,187.

- Waste Area

  Activities conducted in association with the waste area are: excavation of the buried drums and heavily contaminated materials; hauling waste from Area A to the staging/characterization/storage area; ground water level controls; waste material/drum handling; and decontamination of the staging/characterization/storage area. The total cost for this item of the remedy is $1,678,278.

- Off-Site Thermal Destruction

  The activities associated with off-site thermal destruction are: waste characterization; waste hauling; and off-site thermal destruction costs. This portion of the remedy is estimated to be $7,910,520.

- Operational Costs

  These operational costs associated with the first operable unit are subdivided into ten classifications (see Table 7). Increased health and safety working levels include upgrade from standard field clothing to respiratory and dermal protection. Burden refers to the remedial contractors' field labor costs (i.e., Workman's Compensation Insurance, workers benefits, etc.) as well as various insurance coverages (e.g., builders insurance). Labor costs include administrative and overhead costs. Materials refer to remedial action related purchases. Subcontracting costs are self-explanatory. Indirect costs are associated with remedial action support activities (i.e., security costs, first aid, communications, utilities, travel, field office use, etc.). Profit costs as well as health and safety monitoring are self-explanatory. Contingency costs allow for a 15 percent cost contingency. The engineering cost pertains to the RD. The total cost estimate associated with operational costs is $10,336,139.

The cost of $20,800,124 is the summation of the annual or immediate implementation costs. The total present worth cost for this alternative is $21,153,000.

Statutory Determinations

Pursuant to CERCLA, as amended by SARA, EPA must select remedies that: are protective of human health and the environment; attain ARARs; are cost-effective; utilize permanent solutions and alternate treatment technologies or resource recovery technologies to the maximum extent practicable; and provide preference for treatment as a principal element.

The following sections describe how the selected remedy applies to each of the aforementioned statutory determinations.

Protectiveness

The selected site remedy provides significant protection of human health and the environment by effectively mitigating the source of contamination at the Ewan Property site. The principal threat involves the ingestion of contaminated ground water. The selected remedy will include the removal of the waste and heavily contaminated materials appropriate for thermal destruction from the site. Waste and heavily contaminated materials which are not appropriate for this technology will be further tested to determine their most appropriate disposal or treatment. These materials are the "source" contributing to the ground water contamination underlying the site. The remediation of the source will greatly reduce the potential for the expansion of the ground water plume. The remedial alternatives which address the ground water contamination and lesser contaminated soils will be detailed in a separate feasibility study.

A component of the selected remedy includes the off-site thermal destruction of the source materials. Thermal destruction is considered an alternative technology which can effectively reduce the mobility, toxicity, or volume of the site source material contaminants.

Additional protection is provided from the remedial action air and ground water monitoring programs. Contingency plans will be enacted if either program indicates concern.

Compliance with Applicable or Relevant and Appropriate Requirements

Applicable or relevant and appropriate requirements (ARARs) relate to those Federal and State laws, regulations and policies which must be considered in evaluating remedial alternatives. ARARs can be classified as: action specific, chemical specific and location specific.

The first operable unit for the Ewan Property is only part of a total remedial action which when completed, will attain a level or standard of control at least equivalent to the legally binding ARARs for the site. Chemical specific ARARs for soils and ground water will, therefore, not be achieved by this first operable unit since it is not intended to mitigate the site to final cleanup standards. This first operable unit addresses source remediation; final cleanup criteria will be addressed in Operable Unit Two. The second operable unit involves the remediation of the contaminated ground water and if needed, lesser contaminated soils.

Action specific ARARs pertain to meeting the requirements for the enactment of the remedial action. The appropriate requirements of the Resource Conservation and Recovery Act (RCRA) and New Jersey hazardous waste regulations will be followed during the remedial action. All staging and testing areas constructed on-site will comply with the current RCRA (40 CFR Part 264.14, 40 CFR Part 264.17, 40 CFR Part 264.31, 40 CFR Part 264.33, 40 CFR Part 264.114, 40 CFR Part 264.193, et al.) and New Jersey hazardous waste standards. Furthermore, the remedy will contain provisions for adequately storing all wastes, prior to transport off-site, so as to minimize the potential release of hazardous waste or its constituents into the environment.

Based upon the Land Disposal Restriction (LDR) provisions, RCRA hazardous waste in accordance with 40 CFR Part 261 (i.e., hazardous waste is defined as listed or characteristic) which is excavated, treated and then disposed of constitutes placement and, therefore, the LDR requirements are potentially ARARs.

To determine whether a waste is a listed RCRA hazardous waste, it is necessary to know the source or the use of the waste. When it is not possible to make an affirmative determination that the wastes are listed RCRA hazardous wastes, RCRA requirements are not applicable to CERCLA actions, but may be relevant and appropriate if the CERCLA action involves treatment, storage or disposal and if the wastes are similar or identical to RCRA hazardous wastes. Because it has not been determined with certainty that the wastes at the Ewan Property site are RCRA listed hazardous wastes, EPA has determined that the RCRA LDR requirements are not applicable.

Although the LDR requirements are not applicable in terms of a listed hazardous waste, they may be applicable if the waste is identified as RCRA characteristic hazardous waste. A RCRA characteristic hazardous waste is identified as a waste which exhibits the characteristics of either ignitability, corrosivity, reactivity or toxicity (using the extraction procedure (EP)).

The waste at the Ewan Property site did not appear to exhibit RCRA hazardous waste characteristics. Furthermore, virtually all of the contaminants would be destroyed after treatment. As a result, the LDR requirements are also not applicable.

EPA has undertaken an LDR rulemaking that appies to soil and debris which extends the time period for disposing of these materials in landfill facilities. Therefore, LDR is not considered relevant and appropriate at this time.

Finally, all wastes removed from the site, including the decontamination fluids, must be taken to a permitted RCRA facility which must be in compliance with EPA's Off-Site Policy. The transportation of these wastes will comply with Department of Transportation hazardous waste regulations.

Location specific ARARs pertain to the potential impacts of the remedial actions on specific land classifications. The selected remedy may have an impact on wetlands located within the vicinity of the site. Additional information will be collected during and/or prior to the remedial design to evaluate this potential impact. If this additional information indicates that the selected remedy may, in fact, have an impact on a wetland, a wetlands assessment will then be conducted to ensure compliance with Executive Order 11990 before the remedial action is initiated. Other potential impacts upon other nearby land classifications will also be evaluated during and/or prior to the remedial design. If these potential impacts are identified, additional potential ARAR sources will be complied with. The ARAR sources are Executive Order 11998 (Floodplain Management), the Endangered Species Act, the Farmland Protection Act, and the Wild and Scenic Rivers Act.

The first operable unit for the Ewan Property is not designed to remediate the contaminant concentrations to final site conditions, but is intended to mitigate the source of contamination. This operable unit will not clean up the site to a degree that will allow its deletion from the National Priorities List. The final site cleanup will be achieved at the conclusion of Operable Unit Two. This first operable unit will remove the source in order to reduce contaminant leachate migrating into the ground water.

Cost-Effectiveness

As previously stated, the selected remedy is cost-effective based upon the assumption that the 4,500 CY estimate is a maximum value.

Cost separation between Remedial Alternatives 2 and 3 is $1.5 million. As previously stated, these values were generated utilizing the estimated "worst case" scenerio of 4,500 CY. It is EPA's judgement that the costs for this remedy are proportionate to the level of protection provided and that this level is afforded via thermal destruction of the majority of the source materials.

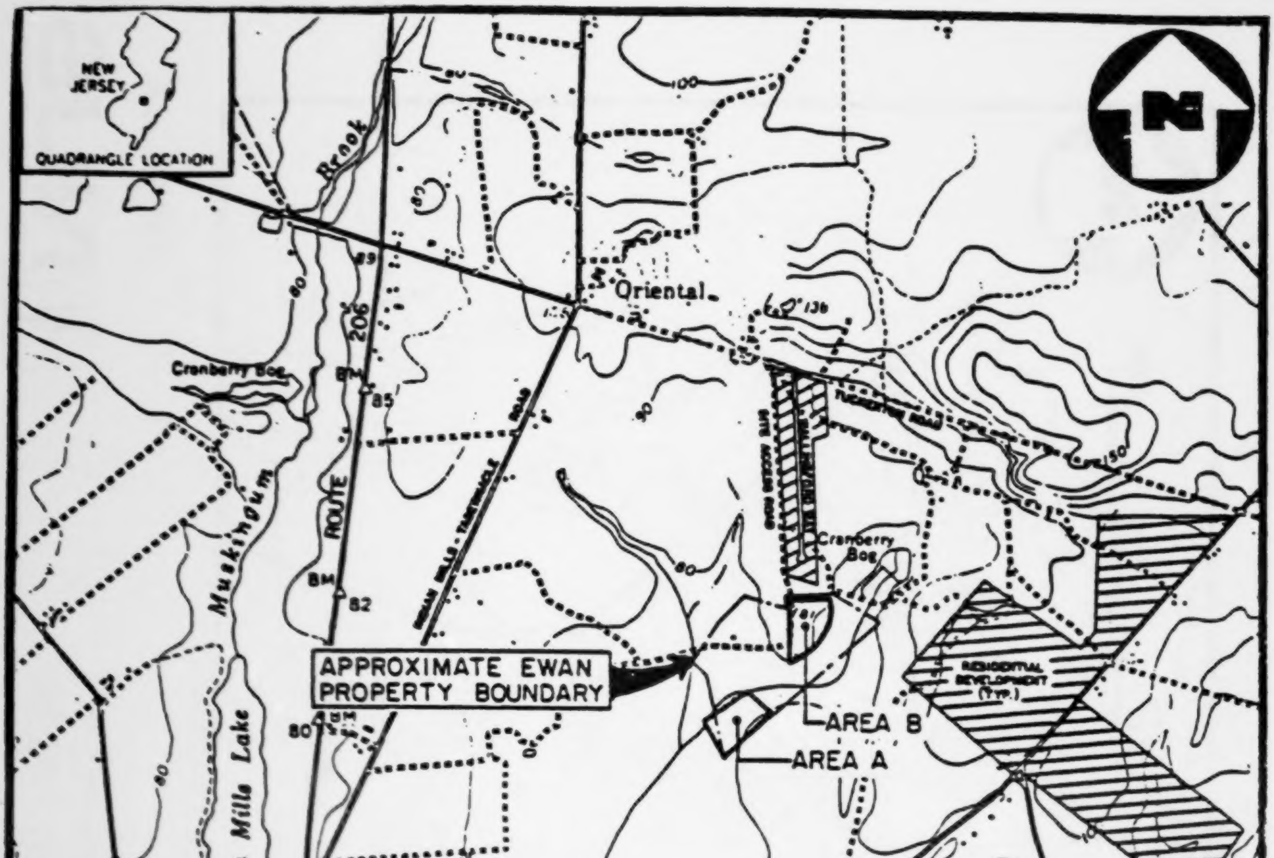
Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

The selected remedy is a permanent solution for the source materials present at the Ewan Property. A majority of the source has been determined to be appropriate for thermal destruction. Thermal destruction is a proven permanent solution for the remediation of many organic substances. Source materials which are not appropriate for thermal destruction will be further analyzed to determine permanent disposal or treatment methods. Implementation of this remedy is the utilization of a permanent solution to the maximum extent practicable for this site.

Preference for Treatment as a Principal Element

Thermal destruction of the source materials is the principal element of the selected remedy. EPA has been assured that the majority of the source materials are appropriate for thermal destruction. Source materials which are not appropriate for thermal destruction will be further analyzed to determine the most appropriate disposal or treatment remedy. Emphasis for treatment of waste which is not appropriate for thermal destruction will be applied after sufficient analysis has been performed.

FIGURES

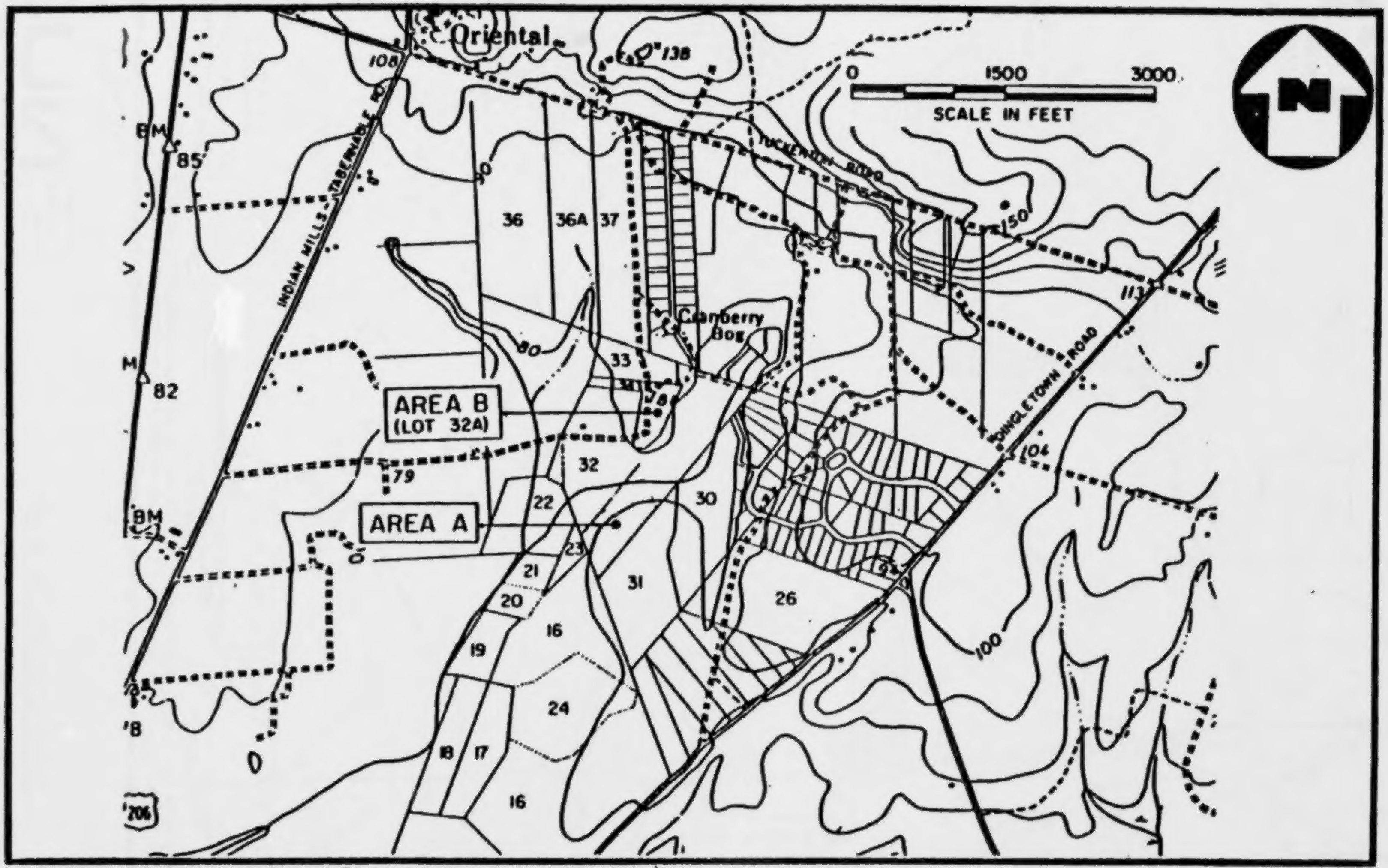

NEW JERSEY
QUADRANGLE LOCATION
N
Brook
Oriental
ROUTE 206
Cranberry Bog
Muskingum
Indian Mills Lake
APPROXIMATE EWAN PROPERTY BOUNDARY
Cranberry Bog
RESIDENTIAL DEVELOPMENT (TYP.)
AREA B
AREA A
Indian Mills
39° 47' 30" N
74° 42' 30" W
Cranberry Bog
Cranberry Bog
Cranberry Boys
Cranberry Bogs
Cranberry Bogs
Springers Brook
0
2000
4000
SCALE IN FEET
LEGEND
RESIDENTIAL DEVELOPMENT

BASE MAP IS A PORTION OF THE U.S.G.S. SOUTHWEST INDIAN MILLS, NJ QUADRANGLE (7.5 MINUTE SERIES, 1957, PHOTOINSPECTED 1972, CONTOUR INTERVAL 10 FEET). EWAN PROPERTY LOCATION IS APPROXIMATE.

FIGURE 1

SITE LOCATION MAP
EWAN PROPERTY SITE, SHAMONG TWP., NJ

NUS CORPORATION

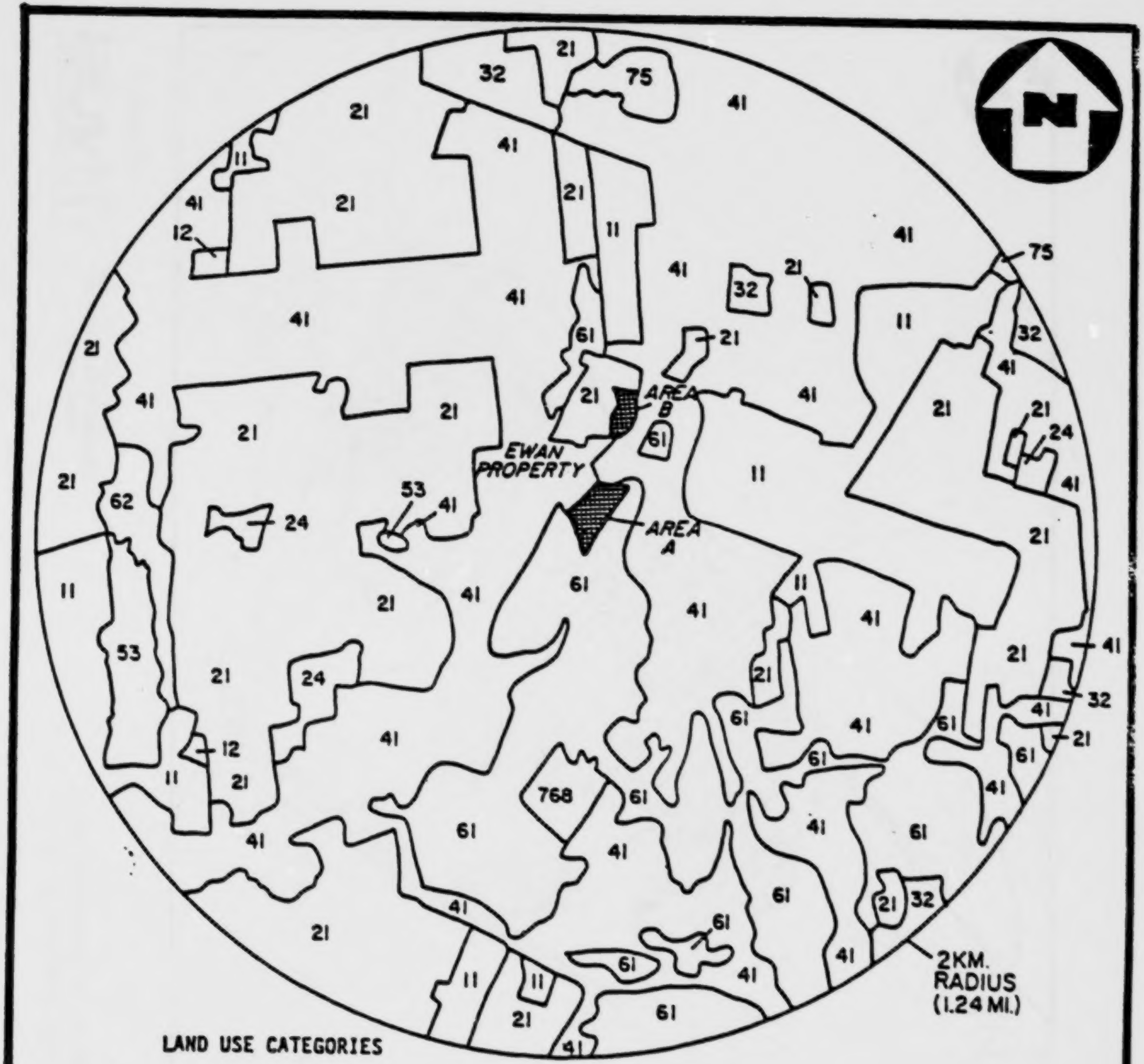

Oriental
138
0
1500
3000
SCALE IN FEET
N
108
BM
85
TABERNACLE RD
INDIAN MILLS
36
36A
37
TUCKERTON ROAD
150
113
Cranberry Bog
33
80
M
82
AREA B
(LOT 32A)
32
79
22
30
AREA A
BM
23
21
20
31
26
16
19
24
18
17
16
206
DINGLETOWN ROAD
104
100

NOTE: LOT NUMBERS AND PROPERTY LINES TAKEN FROM SHAMONG TWP. TAX MAP NO. 5, BLOCKS 23 AND 23F.

FIGURE 2

APPROXIMATE TRACT ARRANGEMENT
EWAN PROPERTY SITE, SHAMONG TWP., NJ

NUS CORPORATION


N
EWAN PROPERTY
AREA B
AREA A
2KM. RADIUS (1.24 MI.)
21
32
75
41
11
12
24
53
61
62
768

LAND USE CATEGORIES

11	Residential
12	Commercial
21	Cropland and Pasture
24	Farmsteads and Farm-Related Buildings
32	Shrub-Brush Rangeland
41	Deciduous Forest
53	Man-Made Reservoirs and Impoundments
61	Forested Wetlands
62	Non-Forested Wetlands
75	Extraction
768	Unidentifiable

SOURCE: EPIC, 1984 TS-PIC-84155

FIGURE 3

LAND USE CATEGORIES
EWAN PROPERTY SITE, SHAMONG TWP., NJ

NUS CORPORATION

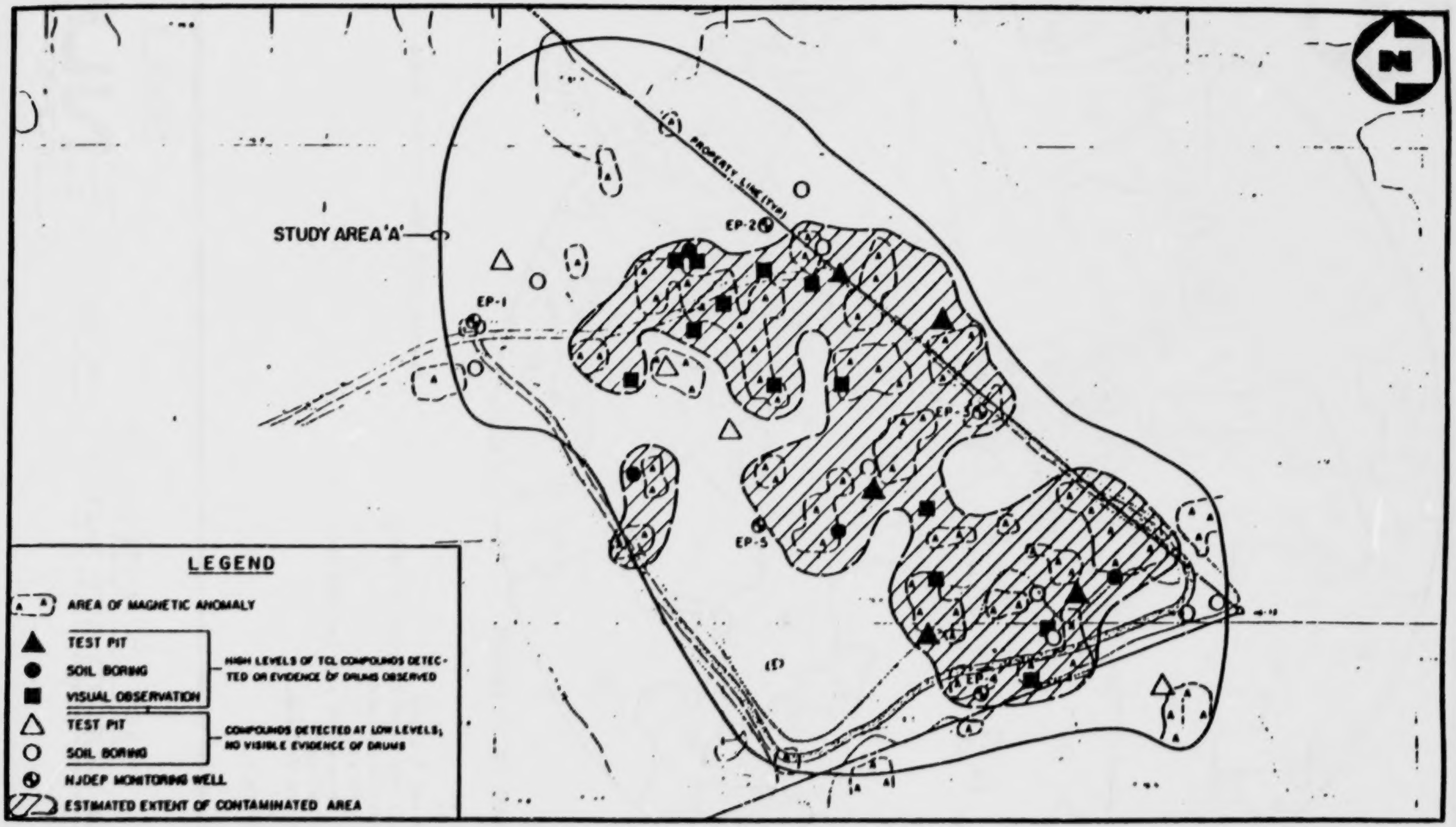

N
PROPERTY LINE (TYP)
STUDY AREA 'A'
EP-1
EP-2
EP-3
EP-4
EP-5
LEGEND
AREA OF MAGNETIC ANOMALY
TEST PIT
SOIL BORING
VISUAL OBSERVATION
HIGH LEVELS OF TCL COMPOUNDS DETECTED OR EVIDENCE OF DRUMS OBSERVED
TEST PIT
SOIL BORING
COMPOUNDS DETECTED AT LOW LEVELS; NO VISIBLE EVIDENCE OF DRUMS
NJDEP MONITORING WELL
ESTIMATED EXTENT OF CONTAMINATED AREA
0
100
200
SCALE IN FEET

FIGURE 4

APPROXIMATE EXTENT OF CONTAMINATED AREA
EWAN PROPERTY SITE, SHAMONG TWP., NJ

NUS CORPORATION

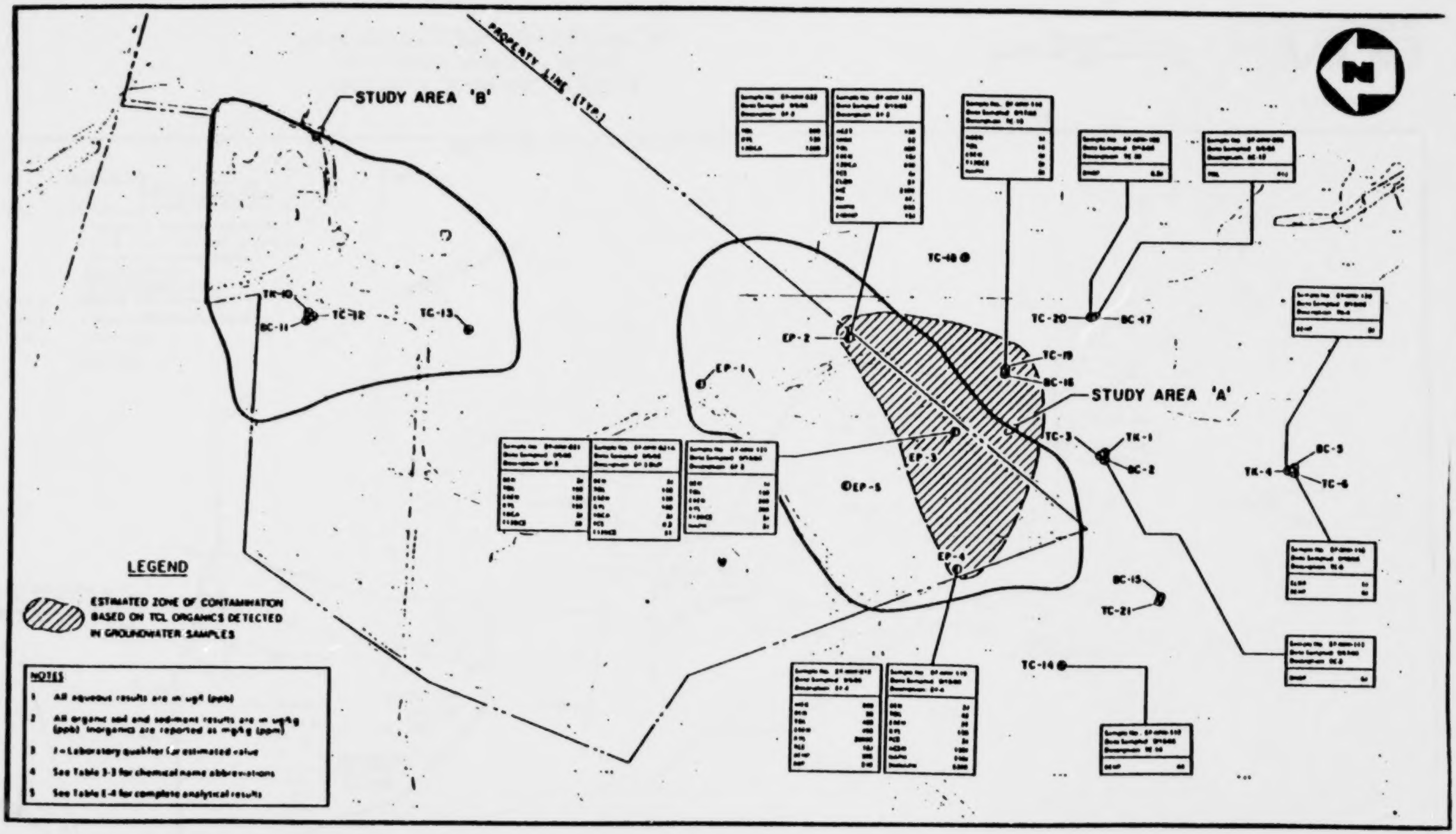

N
PROPERTY LINE (TYP.)
STUDY AREA 'B'
TK-10
BC-11
TC-12
TC-13
STUDY AREA 'A'
TC-18
TC-20
BC-17
EP-2
EP-1
TC-19
BC-16
TC-3
TK-1
BC-2
BC-5
TK-4
TC-6
EP-3
EP-5
EP-4
BC-15
TC-21
TC-14
LEGEND
ESTIMATED ZONE OF CONTAMINATION BASED ON TCL ORGANICS DETECTED IN GROUNDWATER SAMPLES
NOTES
1 All aqueous results are in ug/l (ppb)
2 All organic soil and sediment results are in ug/kg (ppb) Inorganics are reported as mg/kg (ppm)
3 J = Laboratory qualifier for estimated value
4 See Table 3-3 for chemical name abbreviations
5 See Table E-4 for complete analytical results
0
200
400
SCALE IN FEET

FIGURE 5

TCL ORGANIC CONSTITUENTS DETECTED IN MONITORING WELLS
EWAN PROPERTY SITE, SHAMONG TWP., NJ

NUS CORPORATION

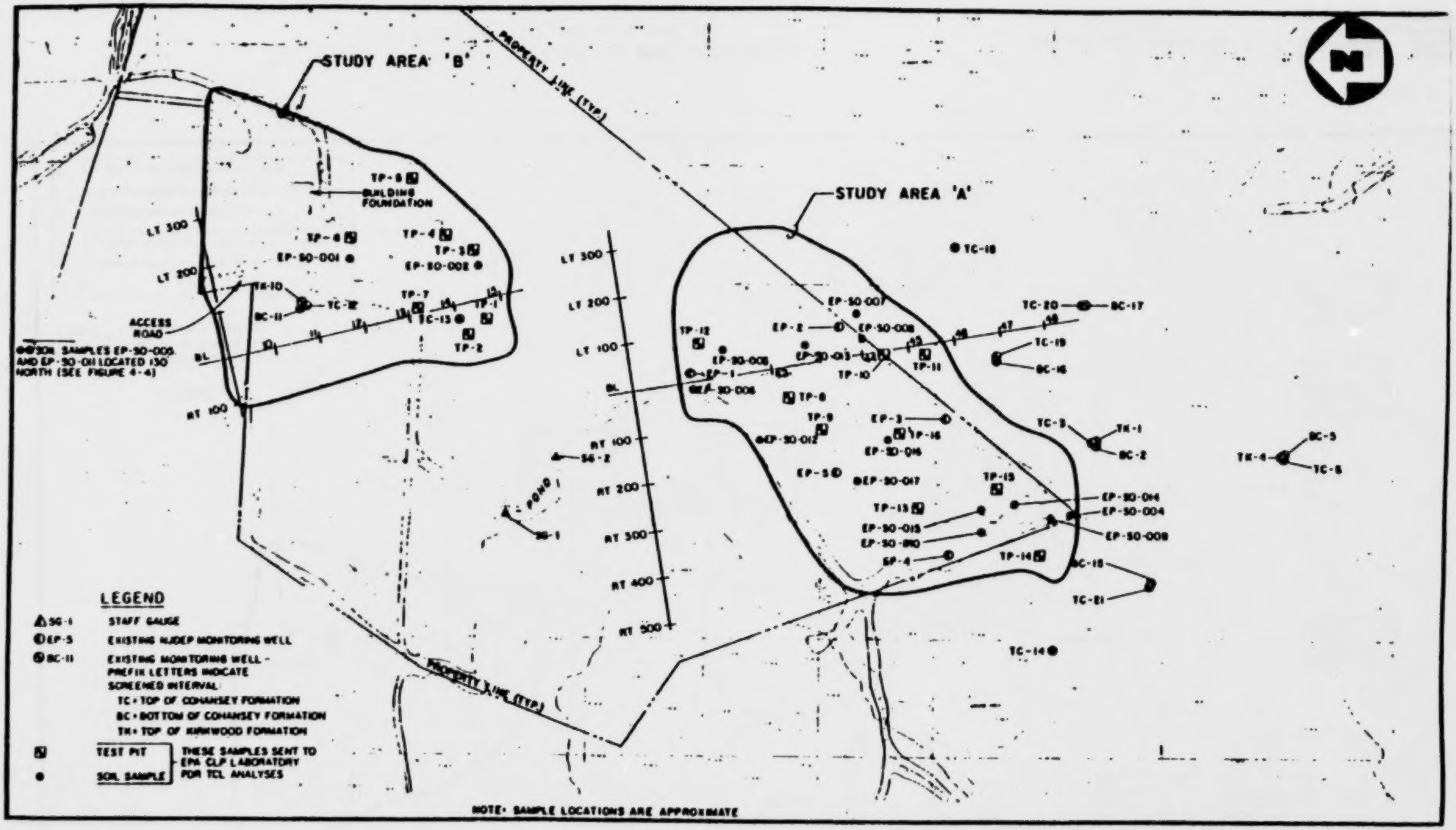

STUDY AREA 'B'
STUDY AREA 'A'
PROPERTY LINE (TYP.)
TP-8
BUILDING FOUNDATION
TP-6
TP-4
TP-3
EP-SO-001
EP-SO-002
TK-10
TC-12
BC-11
TP-7
TC-13
TP-1
TP-2
ACCESS ROAD
SOIL SAMPLES EP-SO-005 AND EP-SO-011 LOCATED 130 NORTH (SEE FIGURE 4-4)
LT 300
LT 200
LT 100
BL
RT 100
RT 200
RT 300
RT 400
RT 500
SG-2
SG-1
POND
TC-18
EP-SO-007
EP-2
EP-SO-008
TP-12
EP-SO-003
EP-SO-013
EP-1
EP-SO-006
TP-10
TP-11
TP-6
TP-9
EP-3
TP-16
EP-SO-012
EP-SO-016
EP-5
EP-SO-017
TP-15
TP-13
EP-SO-015
EP-SO-010
EP-4
TP-14
TC-20
BC-17
TC-19
BC-16
TC-3
TK-1
BC-2
TK-4
BC-5
TC-6
EP-SO-014
EP-SO-004
EP-SO-009
BC-15
TC-21
TC-14
LEGEND
SG-1 STAFF GAUGE
EP-5 EXISTING NJDEP MONITORING WELL
BC-11 EXISTING MONITORING WELL - PREFIX LETTERS INDICATE SCREENED INTERVAL:
TC = TOP OF COHANSEY FORMATION
BC = BOTTOM OF COHANSEY FORMATION
TK = TOP OF KIRKWOOD FORMATION
TEST PIT
SOIL SAMPLE
THESE SAMPLES SENT TO EPA CLP LABORATORY FOR TCL ANALYSES
NOTE: SAMPLE LOCATIONS ARE APPROXIMATE

FIGURE 6

SUMMARY OF RI SAMPLE LOCATIONS
(EXCLUDING DOMESTIC WELLS)
EWAN PROPERTY SITE, SHAMONG TWP., NJ

0
200
400
SCALE IN FEET

NUS CORPORATION

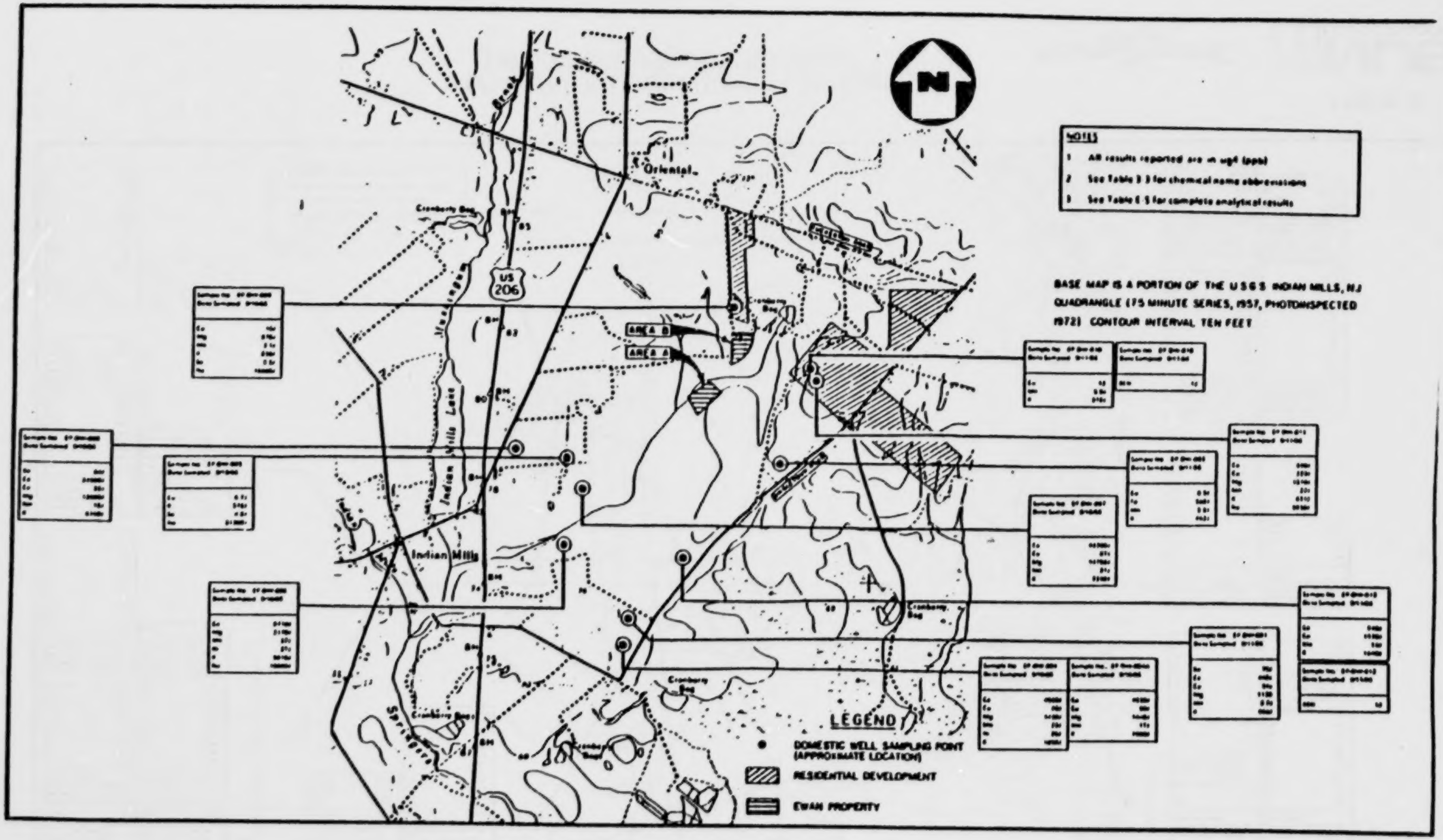
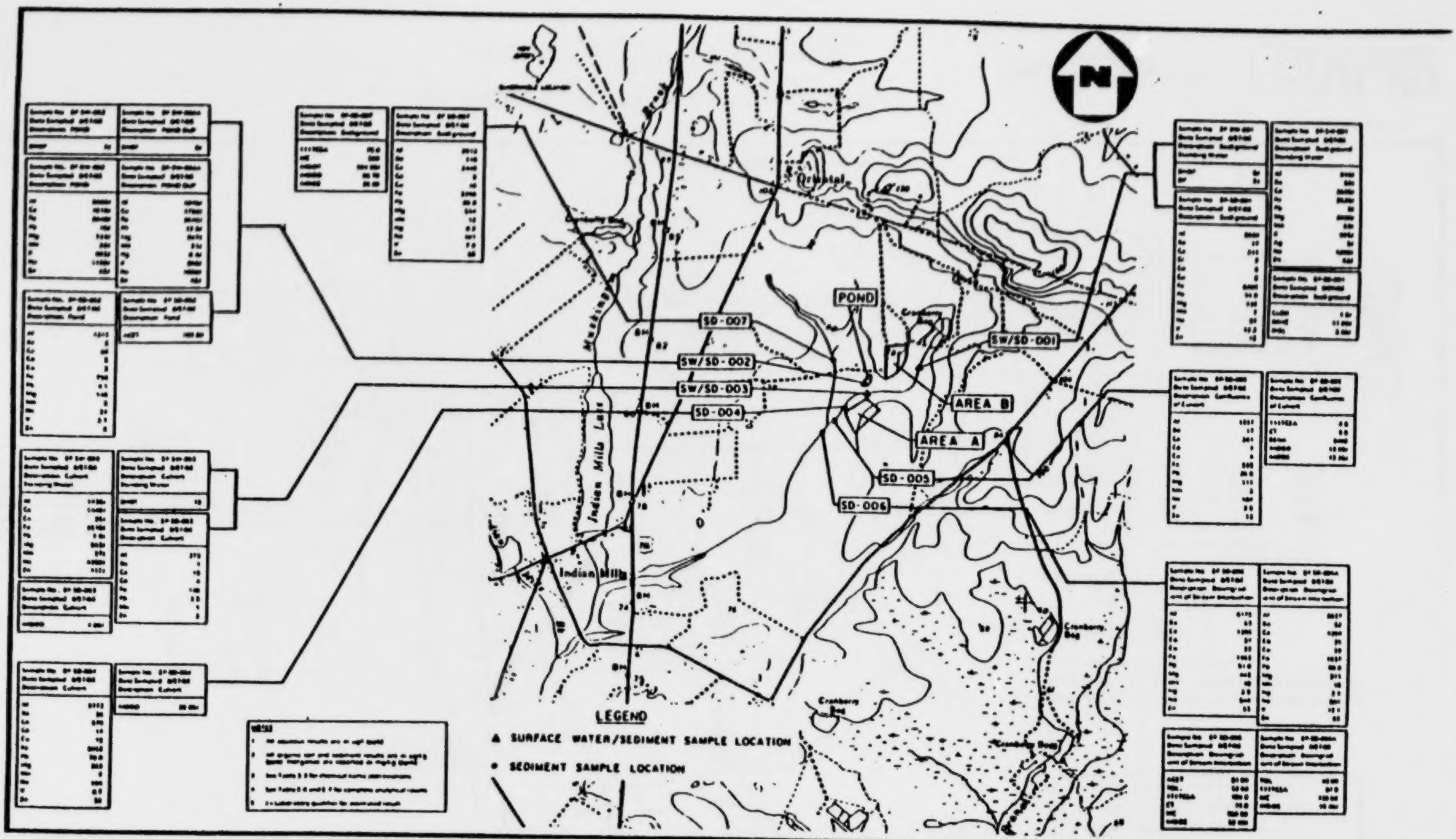

NOTES
1 All results reported are in ug/l (ppb)
2 See Table 3.3 for chemical name abbreviations
3 See Table E-5 for complete analytical results
BASE MAP IS A PORTION OF THE U.S.G.S. INDIAN MILLS, NJ QUADRANGLE (7.5 MINUTE SERIES, 1957, PHOTOINSPECTED 1972) CONTOUR INTERVAL TEN FEET
N
LEGEND
DOMESTIC WELL SAMPLING POINT (APPROXIMATE LOCATION)
RESIDENTIAL DEVELOPMENT
EWAN PROPERTY
AREA B
AREA A
US 206
Oriental
Indian Mills
Indian Mills Lake
Cranberry Bog
Springers

FIGURE 7

TCL INORGANIC AND ORGANIC CONSTITUENTS DETECTED IN DOMESTIC WELLS
EWAN PROPERTY SITE, SHAMONG TWP., NJ

0 2000 4000
SCALE IN FEET

NUS CORPORATION



SD-007
SW/SD-002
SW/SD-003
SD-004
SD-005
SD-006
SW/SD-001
POND
AREA B
AREA A
Indian Mills Lake
Indian Mills
Oriental
Cranberry Bog
LEGEND
▲ SURFACE WATER/SEDIMENT SAMPLE LOCATION
● SEDIMENT SAMPLE LOCATION

SURFACE WATER & SEDIMENT SAMPLE LOCATIONS
EWAN PROPERTY SITE, SHAMONG TWP., NJ

0
2000
4000
SCALE IN FEET

FIGURE 8

NUS CORPORATION

TABLES

TABLE 1

SAMPLE TYPE: EWAN PROPERTY - TEST PITS

COMPOUND	# OF POSITIVE DETECTIONS	MINIMUM DETECTED CONC.	MAXIMUM DETECTED CONC.	AVERAGE
2-BUTANONE	1	580.00	580.00	580.00
4-METHYL-2-PENTANONE	4	3.00	21.00	9.25
ETHYLBENZENE	3	2.00	6.00	4.33
TOTAL XYLENES	4	8.00	38.00	19.25
1,1-DICHLOROETHANE	3	2.00	2.00	2.00
TETRACHLOROETHENE	1	4.00	4.00	4.00
TRANS-1,2-DICHLOROETHENE	2	13.00	14.00	13.50
BIS(2-ETHYLHEXYL)PHTHALATE	1	65.00	65.00	65.00
DI-N-OCTYL PHTHALATE	3	10.00	1400.00	473.33
DI-N-BUTYL PHTHALATE	15	3.00	170.00	74.13
BUTYL BENZYL PHTHALATE	1	82.00	82.00	82.00
NAPHTHALENE	3	3.00	87.00	31.00
2-METHYLNAPHTHALENE	2	3700.00	11000.00	7350.00
PHENANTHRENE	1	77.00	77.00	77.00
4,4'-DDT	2	8.50	36.00	22.25
4,4'-DDE	2	5.60	10.00	7.80
ALUMINUM	29	1650.00	373000.00	30288.28
ARSENIC	15	1.10	83.00	17.29
BARIUM	15	13.00	760.00	177.40
BERYLLIUM	5	1.20	9.00	6.04
CALCIUM	22	72.00	13000.00	726.05
CHROMIUM	29	3.90	512.00	48.67
COBALT	4	22.00	55.00	34.00
COPPER	15	4.50	4920.00	365.54
IRON	30	19.00	246000.00	39236.53
LEAD	29	0.70	58.00	14.56
MAGNESIUM	29	51.00	24100.00	1986.38
MANGANESE	26	2.30	484.00	79.75
MERCURY	21	0.14	2.00	0.42
NICKEL	9	4.40	165.00	43.86
POTASSIUM	21	115.00	13120.00	2099.38
SILVER	1	1.10	1.10	1.10
SODIUM	16	228.00	6210.00	2427.56
THALLIUM	1	1.80	1.80	1.80
VANADIUM	24	6.50	458.00	90.22
ZINC	26	2.90	387.00	85.51
pH	[illegible]	4.20	5.95	5.02

TABLE I

SAMPLE TYPE: EWAN PROPERTY - SURFACE WATERS

COMPOUND	# OF POSITIVE DETECTIONS	MINIMUM DETECTED CONC.	MAXIMUM DETECTED CONC.	AVERAGE
DI-N-BUTYL PHTHALATE	4	6.00	19.00	9.50
DIETHYL PHTHALATE	1	7.00	7.00	7.00
ALUMINUM	4	650.00	5680.00	3000.00
BARIUM	1	52.00	52.00	52.00
CALCIUM	4	1440.00	3650.00	2162.50
COPPER	1	25.00	25.00	25.00
IRON	4	3510.00	3640.00	3577.50
LEAD	4	3.00	13.80	8.68
MAGNESIUM	4	583.00	2080.00	1008.50
MANGANESE	4	21.00	63.00	34.00
MERCURY	1	0.40	0.40	0.40
POTASSIUM	3	508.00	905.00	659.33
SILVER	1	5.00	5.00	5.00
SODIUM	4	1030.00	4360.00	2705.00
ZINC	4	42.00	117.00	66.00
pH	4	3.60	5.60	4.73

TABLE 1

SAMPLE TYPE: EWAN PROPERTY - SEDIMENTS

COMPOUND	# OF POSITIVE DETECTIONS	MINIMUM DETECTED CONC.	MAXIMUM DETECTED CONC.	AVERAGE
ACETONE	2	91.00	105.00	93.00
TOLUENE	2	13.00	43.00	28.00
1,1,1-TRICHLOROETHANE	4	6.00	100.00	69.00
1,1-DICHLOROETHENE	1	5.00	5.00	5.00
CARBON TETRACHLORIDE	1	15.00	15.00	15.00
CHLOROFORM	1	1.90	1.90	1.90
METHYLENE CHLORIDE	3	33.00	150.00	104.33
BENZOIC ACID	1	3400.00	3400.00	3400.00
BETA-BHC	1	11.60	11.60	11.60
4,4'-DDT	1	104.80	104.80	104.80
4,4'-DDD	4	4.80	85.70	33.30
4,4'-DDE	4	12.60	29.50	17.67
DIELDRIN	1	3.60	3.60	3.60
ALUMINUM	8	273.00	6175.00	3302.63
BARIUM	9	1.00	118.00	38.63
CALCIUM	8	19.00	2449.00	751.88
CHROMIUM	1	7.00	7.00	7.00
COBALT	9	4.00	27.00	12.13
COPPER	7	2.00	33.00	14.29
IRON	8	148.00	6385.00	2256.00
LEAD	9	3.90	91.00	44.88
MAGNESIUM	7	111.00	554.00	292.00
MANGANESE	9	1.00	13.00	7.00
MERCURY	3	0.30	2.10	1.47
SODIUM	7	24.00	581.00	237.86
VANADIUM	6	2.70	13.10	7.68
ZINC	9	3.00	63.00	29.75

TABLE I

SAMPLE TYPE: EWAN PROPERTY - MONITORING WELLS

COMPOUND	# OF POSITIVE DETECTIONS	MINIMUM DETECTED CONC.	MAXIMUM DETECTED CONC.	AVERAGE
ACETONE	1	190.00	190.00	190.00
2-BUTANONE	1	600.00	600.00	600.00
4-METHYL-2-PENTANONE	1	52.00	52.00	52.00
BENZENE	6	1.00	50.00	9.67
TOLUENE	9	14.00	680.00	245.22
ETHYLBENZENE	7	4.00	450.00	135.14
TOTAL XYLENES	6	130.00	2800.00	595.00
1,1-DICHLOROETHANE	2	2.00	2.00	2.00
1,2-DICHLOROETHANE	2	690.00	1300.00	995.00
TETRACHLOROETHENE	1	2.00	2.00	2.00
TRICHLOROETHENE	3	0.30	15.00	7.10
TRANS-1,2-DICHLOROETHENE	4	2.00	21.00	11.50
CHLOROFORM	2	1.00	31.00	16.00
METHYLENE CHLORIDE	1	230.00	230.00	230.00
BIS(2-ETHYLHEXYL)PHTHALATE	4	2.00	300.00	87.50
DI-N-BUTYL PHTHALATE	2	6.00	8.30	7.15
BUTYL BENZYL PHTHALATE	1	240.00	240.00	240.00
ACENAPHTHENE	1	150.00	150.00	150.00
NAPHTHALENE	3	2.00	110.00	38.00
2-METHYLNAPHTHALENE	1	5300.00	5300.00	5300.00
PHENOL	1	47.00	47.00	47.00
4-METHYLPHENOL	1	950.00	950.00	950.00
2,4-DIMETHYLPHENOL	1	15.00	15.00	15.00
ALUMINUM	47	57.00	98100.00	10484.57
ARSENIC	4	11.00	29.00	20.25
BARIUM	24	54.00	1800.00	183.38
CADMIUM	1	9.50	8.50	9.50
CALCIUM	50	277.00	26180.00	2460.66
CHROMIUM	15	8.00	208.00	64.40
COPPER	14	22.00	84.00	37.57
IRON	50	37.00	365000.00	28284.22
LEAD	35	3.00	292.00	18.29
MAGNESIUM	49	222.00	3420.00	935.00
MANGANESE	37	11.00	431.00	66.94
MERCURY	4	0.20	1.00	0.55
NICKEL	6	20.00	40.00	27.00
POTASSIUM	27	497.00	9790.00	2139.33
SILVER	2	5.10	8.00	6.55
SODIUM	50	1150.00	20600.00	3698.12
VANADIUM	9	24.00	257.00	120.33
ZINC	48	11.00	1100.00	164.44

TABLE 1

SAMPLE TYPE: EWAN PROPERTY - MONITORING WELLS

COMPOUND	# OF POSITIVE DETECTIONS	MINIMUM DETECTED CONC.	MAXIMUM DETECTED CONC.	AVERAGE
pH	49	4.42	6.97	5.55

TABLE 1

SAMPLE TYPE: EWAN PROPERTY - DOMESTIC WELLS

COMPOUND	# OF POSITIVE DETECTIONS	MINIMUM DETECTED CONC.	MAXIMUM DETECTED CONC.	AVERAGE
BENZENE	2	1.00	1.00	1.00
BARIUM	2	64.00	78.00	71.00
CALCIUM	9	440.00	43200.00	11097.50
COPPER	11	6.70	1170.00	155.45
IRON	1	560.00	560.00	560.00
MAGNESIUM	8	970.00	14700.00	4406.25
MANGANESE	11	3.10	27.00	14.83
NICKEL	2	25.00	27.00	26.00
POTASSIUM	12	378.00	7290.00	2301.42
SELENIUM	2	3.30	4.00	3.65
SODIUM	4	5050.00	31300.00	18437.50

TABLE 1

SAMPLE TYPE: EWAN PROPERTY - SOILS

COMPOUND	# OF POSITIVE DETECTIONS	MINIMUM DETECTED CONC.	MAXIMUM DETECTED CONC.	AVERAGE
IRON	47	402.00	26797.00	5600.28
LEAD	42	2.00	56600.00	1366.36
MAGNESIUM	35	4.10	1420.00	222.20
MANGANESE	44	1.60	72.00	11.24
MERCURY	1	0.20	0.20	0.20
NICKEL	9	2.10	17.00	5.74
POTASSIUM	21	71.00	1680.00	362.05
SILVER	6	3.30	4.50	3.87
SODIUM	25	3.50	1270.00	239.57
VANADIUM	42	3.20	31.00	10.98
ZINC	46	2.00	450.00	28.32
CYANIDE	2	0.80	3.40	2.10

SAMPLE TYPE: EWAN PROPERTY - SOILS

COMPOUND	# OF POSITIVE DETECTIONS	MINIMUM DETECTED CONC.	MAXIMUM DETECTED CONC.	AVERAGE
ACETONE	1	110000.00	110000.00	110000.00
2-BUTANONE	2	20.00	44000.00	22010.00
2 HEXANONE	1	11.00	11.00	11.00
4-METHYL-2-PENTANONE	3	28.00	97000.00	32356.00
TOLUENE	2	5900.00	570000.00	287950.00
ETHYLBENZENE	3	1.00	20000.00	6910.33
TOTAL XYLENES	4	1.00	77000.00	20477.50
1,1,1-TRICHLOROETHANE	4	6.10	72.00	36.77
TETRACHLOROETHENE	1	24000.00	24000.00	24000.00
TRICHLOROETHENE	1	9100.00	8100.00	9100.00
METHYLENE CHLORIDE	1	77000.00	77000.00	77000.00
BIS(2-ETHYLHEXYL)PHTHALATE	2	410.00	28000.00	14205.00
DI-N-OCTYL PHTHALATE	1	38.00	38.00	38.00
DI-N-BUTYL PHTHALATE	6	48.00	2700.00	1179.50
DIETHYL PHTHALATE	3	35.00	71.00	47.67
BUTYL BENZYL PHTHALATE	1	27000.00	27000.00	27000.00
ACENAPHTHENE	1	9700.00	9700.00	9700.00
ANTHRACENE	1	1800.00	1800.00	1800.00
BENZO(A)ANTHRACENE	1	180.00	180.00	180.00
BENZO(K)FLUORANTHENE	1	38.00	38.00	38.00
CHRYSENE	2	37.00	38.00	37.50
FLUORANTHENE	2	38.00	2300.00	1169.00
FLUORENE	1	2100.00	2100.00	2100.00
2-METHYLNAPHTHALENE	3	180.00	440000.00	149326.67
PHENANTHRENE	4	38.00	77000.00	20854.50
PYRENE	4	38.00	3100.00	806.00
DIBENZOFURAN	1	2000.00	2000.00	2000.00
PHENOL	1	200.00	200.00	200.00
PENTACHLOROPHENOL	2	43.00	69.00	56.00
HEPTACHLOR EPOXIDE	1	2.90	2.90	2.90
4,4'-DDT	4	3.60	21.00	12.90
4,4'-DDD	2	2.10	170.00	86.05
4,4'-DDE	5	0.60	50.00	17.22
ALUMINUM	47	251.00	9163.00	2891.77
ANTIMONY	1	99.00	99.00	99.00
ARSENIC	5	2.00	8.80	4.00
BARIUM	35	2.00	2770.00	93.03
BERYLLIUM	9	0.20	0.40	0.32
CALCIUM	30	19.00	1120.00	166.95
CHR[illegible]UM	47	1.10	11400.00	251.41
COB	16	3.00	45.00	6.38
COPPER	21	1.30	401.00	22.70

TABLE 2

NJDEP AND REMEDIAL INVESTIGATION WASTE SAMPLE DATA (μg/kg)
EWAN PROPERTY SITE, SHAMONG TOWNSHIP, NEW JERSEY

Parameter	ES-1[1]	ES-2[1]	ES-3[1]	ES-4[1]	WA-001[2] (Test Pit 10)	WA-002[2] (Test Pit 15)
Organics						
Methylene Chloride	-	825	-	-	8	22,000
Tetrachloroethene	-	100	145	-	-	270
Toluene	-	295	-	285,000	-	-
Benzene	-	11,800	-	30,600	-	-
o-Xylene	225	408	-	26,300	-	980*
m-Xylene	115	5,763	185	43,100	-	-
p-Xylene	-	2,685	-	17,100	-	-
1,2-Dichloroethene	-	145	-	-	-	-
1,2-Dichloroethane	250	-	-	-	-	-
o-Dichlorobenzene	415	-	-	415	-	-
Ethylbenzene	-	2,630	-	-	-	700
Naphthalene	-	1,585	-	400,000	-	-
Phenanthrene/anthracene	800	-	-	227,000	-	-
Pyrene	200	-	-	-	-	-
Chrysene	-	-	-	-	-	-
Acenaphthylene	-	-	-	385,000	-	-
Benzo(a)anthracene/chrysene	-	14,000	-	-	-	-
Hexachlorobutadiene	-	-	-	980	-	-
Styrene	-	-	-	6,800	-	-

TABLE 2
NJDEP AND REMEDIAL INVESTIGATION
WASTE SAMPLE DATA
EWAN PROPERTY SITE, SHAMONG TOWNSHIP, NEW JERSEY
PAGE TWO

Parameter	ES-1[1]	ES-2[1]	ES-3[1]	ES-4[1]	WA-001[2] (Test Pit 10)	WA-002[2] (Test Pit 15)
Organics - Continued						
1,2,4-Trimethylbenzene	-	-	-	20,100	-	-
1,3,5-Trimethylbenzene	-	-	-	8,300	-	-
Phenol	11,200	-	-	-	-	-
4-Nitrophenol	-	-	61,000	-	-	-
sec-Butylbenzene	-	-	-	385	-	-
4-Chlorophenyl phenyl ether	-	25,000	-	-	-	-
o-Chlorotoluene	-	-	-	3,300	-	-
N-propylbenzene	-	-	-	3,200	-	-
bis(2-ethylhexyl)phthalate	-	-	-	300,000	-	-
Di-n-butylphthalate	-	-	-	190,000	-	-
Diethylphthalate	-	-	-	205,080	-	-
Inorganics						
Antimony	-	188	126	-	-	-
Arsenic	-	468	4,933	50	-	-
Cadmium	1,990	-	-	1,920	-	-
Chromium (Total)	29,400	2,190	1,320	-	-	-

TABLE 2
NJDEP AND REMEDIAL INVESTIGATION
WASTE SAMPLE DATA
EWAN PROPERTY SITE,SHAMONG TOWNSHIP, NEW JERSEY
PAGE THREE

Parameter	ES-1[1]	ES-2[1]	ES-3[1]	ES-4[1]	WA-001[2] (Test Pit 10)	WA-002[2] (Test Pit 15)
Inorganics - Continued						
Copper	2,460	-	1,050	10,600	-	-
Lead	8,810	-	-	3,490	-	-
Mercury	-	46	68	-	-	-
Nickel	8,230	993	2,080	7,100	-	-
Selenium	-	-	-	134	-	-
Silver	1,650	-	-	1,220	-	-
Zinc	3,120	9,360	55,600	135,000	-	-

[1] NJDEP samples, July 6, 1983
[2] Samples collected during RI
* Total Xylenes

TABLE 3

FUTURE HAZARD INDICES AND CARCINOGENIC RISKS FOR RECEPTOR EXPOSURE TO ORGANIC GROUNDWATER CONTAMINATION EWAN PROPERTY SITE, SHAMONG TOWNSHIP, NEW JERSEY

Compound	Ingestion Route				Inhalation Route			
	Hazard Index		Carcinogenic Risk		Hazard Index		Carcinogenic Risk	
	92m	920m	92m	920m	92m	920m	92m	920m
Methylethylketone	0.017	7.2×10^{-4}			0.059	2.5×10^{-3}		
Methyl isobutyl ketone	0.014	5.2×10^{-4}						
Benzene			3.0×10^{-5}	1.0×10^{-6}			2.4×10^{-5}	8.1×10^{-7}
Toluene	0.018	4.0×10^{-4}			5.7×10^{-3}	1.3×10^{-4}		
Ethylbenzene	0.025	4.0×10^{-4}			0.039	6.3×10^{-4}		
Xylenes	1.8	0.031			0.07	1.2×10^{-3}		
1,2-Dichloroethane			1.5×10^{-3}	4.8×10^{-5}			9.5×10^{-4}	3.5×10^{-5}
Trichloroethene			1.8×10^{-6}	5.4×10^{-8}			1.2×10^{-6}	3.5×10^{-8}
Tetrachloroethene	7.5×10^{-4}	1.6×10^{-5}	7.7×10^{-7}	1.6×10^{-8}			4.1×10^{-7}	8.3×10^{-10}
Chloroform			4.1×10^{-5}	1.5×10^{-6}			6.6×10^{-5}*	2.4×10^{-6}*
Methylene Chloride	0.052	2.0×10^{-3}	2.3×10^{-5}	9.0×10^{-7}			7.0×10^{-5}	2.6×10^{-6}
Bis(2-ethylhexyl) phthalate	1.7×10^{-3}	1.5×10^{-5}	2.3×10^{-8}	2.0×10^{-10}				
Total HI or Risk:	1.9	0.03	1.6×10^{-3}	5.1×10^{-5}	0.17	4.4×10^{-3}	1.1×10^{-3}	4.1×10^{-5}

* Oral CPF used

TABLE 4

FUTURE HAZARD INDICES FOR INGESTION OF INORGANIC CONTAMINANTS EWAN PROPERTY SITE, SHAMONG TOWNSHIP, NEW JERSEY

Element	Hazard Index (Dose/RfD) (92 m)	Hazard Index (Dose/RfD) (920 m)
Barium	0.49	0.15
Chromium	0.58*	0.18
Copper	0.81	0.12
Lead	2.93	0.86
Total HI	4.81	1.31

*Calculated using RfD for Chromium VI.

TABLE 5

CONTAMINANTS EXCEEDING OR PREDICTED TO EXCEED RELEVANT STANDARDS AND GUIDELINES
EWAN PROPERTY SITE
SHAMONG TOWNSHIP, NEW JERSEY

Compound	Maximum Concentration (µg/l)			MCL (µg/l)	MCLG (µg/l)	AWQC (µg/l) Drinking Water Only	Drinking Water Health Advisories (µg/l)		
	Actual On Site	Predicted 92m	Predicted 920m				1-day (10kg)	10-day (10kg)	Lifetime (70kg)
Benzene	50	20.3	0.70	5	0	0.67	235	235	NA
Trichloroethene	15	5.7	0.17	5	0	2.8			
Tetrachloroethene	2	0.54	0.01		0	0.88			
1,2-Dichloroethane	1,300	592	22.3	5	0	0.94	740	740	NA
Methylene Chloride	230	109	4.1			0.19**	13,300	1,500	NA
Chloroform	40	18.0	0.66			0.19			
Total xylenes	2,800	615	10.9		440*		12,000	7,800	2,200
Barium	1,800			1,000	1,500*				1,800
Chromium (VI)	208			50	120*	50	1,400	1,400	170
Lead	292			50	20*	50	40***	40***	40***

* Proposed
** Value is for total trihalomethanes
*** 20 µg/day at 2 liters/day.

TABLE 6
COST COMPARISION OF THE REMEDIAL ALTERNATIVES FOR OPERABLE UNIT ONE OF THE EWAN PROPERTY IN SHAMONG, NEW JERSEY

REMEDIAL ALTERNATIVE	APPROXIMATE CAPITAL COST	APPROXIMATE PRESENT WORTH COST
No Action	$0	$353,000
Excavation and Off-Site Thermal Destruction of Waste and/or Treatment of Waste	$20,800,000	$21,153,000
Excavation and On-Site Thermal Destruction of Waste and/or Treatment of Waste	$18,964,000	$19,317,000

TABLE 7
COST ITEMIZATION OF THE SELECTED REMEDY FOR THE FIRST OPERABLE UNIT REMEDIATION OF THE EWAN PROPERTY IN SHAMONG, NEW JERSEY*

ITEM	COST
Site Preparation	
Upgrading of site roadways	$73,212
Clearing of Area A	$480,375
Staging area construction	$250,000
Decontamination area construction	$50,000
Security fence installation	$21,600
Site Preparation subtotal	$875,187
Waste Area	
Source excavation	$808,960
Waste hauling	$167,848
Groundwater controls	$269,640
Waste/Drum handling	$420,000
Decontamination of Staging Area	$11,830
Waste Area subtotal	$1,678,278
Off-site Incineration	
Waste characterization	$240,000
Waste hauling	$652,600
Off-site incineration	$7,017,920
Off-site incineration subtotal	$7,910,520
Operational costs	
Increased health and safety working levels	$945,845
Burden	$253,874
Labor	$292,932
Material	$12,656
Subcontractor	$871,919
Indirect costs	$1,874,763
Profit	$1,284,121
Health and safety monitoring	640,004
Contingency	$3,328,020
Engineering	$832,005
Operational costs subtotal	$10,336,139
Costs	
Site Preparation	$875,187
Waste Area	$1,678,278
Off-site Incineration	$7,910,520
Operating Costs	$10,336,139
Total	$20,800,124

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* Approximated costs from the Ewan Property Final Feasibility Study of July 1988, Appendix A.

RESPONSIVENESS SUMMARY

EPA WORK ASSIGNMENT NO. 130-2LA5
EPA CONTRACT NO. 68-01-7250

FINAL
RESPONSIVENESS SUMMARY
FOR THE
EWAN PROPERTY SITE
SHAMONG TOWNSHIP, NEW JERSEY

SEPTEMBER 1988

NOTICE

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EWAN PROPERTY SITE
SHAMONG TOWNSHIP, NEW JERSEY

FINAL RESPONSIVENESS SUMMARY

The U.S. Environmental Protection Agency (EPA) held a public comment period from July 31, 1988 through September 12, 1988 for interested parties to comment on EPA's final Remedial Investigation/Feasibility Study (RI/FS) and Proposed Remedial Action Plan (PRAP) for the Ewan Property site.

EPA held a public meeting on August 18, 1988 at the Indian Mills Public School in Indian Mills, New Jersey to describe the remedial alternatives and present EPA's proposed remedial alternatives for the Ewan Property site.

A responsiveness summary is required by Superfund policy for the purpose of providing EPA and the public with a summary of citizens' comments and concerns about the site, as raised during the public comment period, and EPA's responses to those concerns. All comments summarized in this document will be factored into EPA's final decision for selection of the remedial alternatives for cleanup of the Ewan Property site.

I. RESPONSIVENESS SUMMARY OVERVIEW. This section briefly describes the background of the Ewan Property site and outlines the proposed remedial alternatives for the Ewan Property site.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS. This section provides a brief history of community interest and concerns regarding the Ewan Property site.

III. SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS. This section summarizes both oral and written comments submitted to EPA at the public meeting and the public comment period, and provides EPA's responses to these comments.

IV. REMAINING CONCERNS. This section discusses community concerns that EPA should be aware of as they prepare to undertake the remedial designs and remedial actions at the Ewan Property site.

I. RESPONSIVENESS SUMMARY OVERVIEW.

The Ewan Property site, consists of forty-three acres located in a heavily wooded area of the Pinelands, the site is located approximately three quarters of a mile south of Tuckerton Road in Shamong Township, New Jersey. The property is surrounded by forests and agricultural land with several residential developments located north and east of the site. The nearest residence is located approximately 2000 feet away.

There were two areas on the site where waste disposal was suspected. The remedial investigation focused on these areas noted as Area A (approximately nine acres) and Area B (approximately five acres). No indication of any dumping activity was observed on the remaining portions of the forty-three acre property. The areas are identified in the Ewan Property RI/FS.

The results of the remedial investigation activities indicate that disposal and burial of an estimated 500 to 8000 drums of industrial waste occurred within approximately four acres of Area A during 1974 and 1975. The primary method of disposal involved the excavation of trenches, the burial of the drums in these trenches, and subsequent re-contouring of the trenched areas.

During the EPA investigation, domestic refuse was encountered in Area B, however, there was no evidence of any hazardous waste disposal nor was industrial type contamination detected in the soils or groundwater underlying Area B. Therefore, Area B will not be addressed under the Superfund program.

The significant findings of the remedial investigation are noted below:

- Approximately 4500 cubic yards (cy) of source material waste are estimated to be buried within Area A. An additional 29,500 cy of material contaminated to varying degrees is estimated to be in close proximity to the source.

- Source area subsurface samples indicate that the principal contaminants of the source materials are largely chlorinated aliphatics organic compounds (i.e. tetrachloroethene, methylene chloride, etc.) and aromatic hydrocarbons (i.e. xylenes, toluene, etc.), as well as lead, barium, and chromium.

- A groundwater contaminant plume originating from Area A has been estimated to be approximately 500 feet long, 600 feet wide, and 30 feet deep. Groundwater within the study areas flows in a southerly direction.

Based upon the projected overall remedial effectiveness and efficiency, EPA has decided to address the remediation of the site in two operable units. The first action, which is the subject of this PRAP, will address the source and heavily contaminated source materials. The second operable unit will address lesser contaminated soils and the contaminated groundwater. Options to remediate these soils and groundwater will be evaluated by EPA, the State of New Jersey and the public after completion of additional studies. Based on preliminary information, it is believed that the contaminated soils and groundwater will be addressed via an on-site treatment process.

The first operable unit will address remediation of the estimated 500 to 8000 buried drums of waste and heavily contaminated materials near the drums. The source volume has been estimated to be approximately 4500 cy. EPA and the New Jersey Department of Environmental Protection (NJDEP) recognize the need to take an action to mitigate the source material at the site. Based upon available knowledge of the source material, it is believed that excavation followed by thermal destruction are the primary alternatives for source remediation.

It is EPA's proposed intent to remove the source of contamination prior to addressing the groundwater contamination and lesser contaminated soils. In this way further additions of contaminants to the groundwater can be prevented, after which the existing groundwater plume can be addressed. As previously mentioned, the contaminated groundwater plume is estimated to be approximately 500 feet long, 600 feet wide and 30 feet deep. The volume of the lesser contaminated materials has been estimated to be approximately 29,500 cy.

Additional public comment will be sought by EPA in evaluating remedial alternatives related to the groundwater contamination and lesser contaminated soil.

The alternatives presented in this section correspond to the remedial alternatives evaluated in the Feasibility Study report. Numerous remedial technologies were initially screened on the basis of reduction of mobility, toxicity or volume (MTV) of the hazardous substance present; treatment effectiveness; and technical implementability. A subsequent screening of alternatives was performed evaluating each remedial alternatives' performance in relation to short-term and long-term impacts, permanent solutions; compliance with applicable or relevant and appropriate requirements (ARARs); overall protection of public health and the environment; and State and community acceptance.

The three remedial alternatives considered after screening numerous possible alternatives are described below. The three alternatives evaluated for the first operable unit in the FS are as follows:

Remedial Alternative 1: No Action

Capital Cost: $0 (Assuming site security fence was installed)
Annual Cost: $22,000 (Monitoring costs and other "institutional contract" costs)
Implementation Time: Indefinite

As required by federal regulations, the "No Action" remedial alternative must be considered by EPA as a potential remedy at each Superfund site. No Action would mean that the source material leachate would continue to migrate off-site and pose potential health and/or environmental threats in the future. This alternative would require local authorities to enact land and water usage restrictions in the area. Residential development in and south of Area A would most likely be prohibited. Monitoring of groundwater would continue to quantify and predict contaminated groundwater movement.

Remedial Alternative 2: Excavation and Off-Site Thermal Destruction of Waste and/or Treatment of Waste

Capital Cost: $20,800,000
Annual Cost: $22,000
Implementation Time: 20 months after remedial design is completed

Excavation and Off-Site Thermal Destruction of Waste and/or Treatment of Waste would involve the identification, excavation, transport and thermal destruction of incinerable source materials. After identification is completed, source materials which are non-incinerable would be treated with the most appropriate remedial technology. Such appropriate technologies may include on-site treatment during the second operable unit of remediation, off-site treatment at a licensed hazardous waste treatment facility, pilot studies of potential treatment methods, etc. This alternative requires that a site access road be constructed and that Area A be cleared of vegetation. Staging and testing areas would be constructed to separate and test the source materials which would be excavated. Site perimeter air monitoring would be conducted during the excavation. Contingencies for excess volatilization or spillage will be enacted upon detection. After materials have been tested for incineration parameters, they will be loaded onto vehicles and transported from the site to an off-site facility legally permitted to incinerate hazardous wastes. Materials which are not incinerable will be treated appropriately. Groundwater will be monitored until completion of the second operable unit of the remedial action. Following completion of this subsequent operable unit, the excavated area will be filled with clean material.

Remedial Alternative 3: Excavation and On-Site Source Thermal Destruction of Waste and/or Treatment of Waste

Capital Cost: $18,964,000
Annual Cost: $22,000
Implementation Time: 26 months after completion of the remedial design

Excavation and On-Site Thermal Destruction of Waste and/or Treatment of Waste involves the thermal destruction of incinerable source materials in an on-site transportable incinerator. This remedial alternative requires that a site access road, and areas for staging and testing of source materials be constructed. In addition, an area for an on-site mobile incinerator would be developed. As with Remedial Alternative 2, Area A will be cleared of vegetation. The on-site incinerator would be fitted with state-of-the-art combustion and air pollution control equipment. During all phases of this remedy, site air and incinerator emissions monitoring would be conducted. Contingencies for excess volatilization, spillage, or malfunction of the thermal destruction unit would be enacted upon detection. Ash generated from this unit will be tested to determine its ultimate disposal. Also, as with Remedial Alternative 2, material which is not incinerable would be appropriately treated. Groundwater would be monitored until completion of the second operable unit. Following completion of this subsequent action, the excavated area would be filled with clean material.

Selection of an Alternative

EPA's selection for remediation at the Ewan Property site will be based on the requirements of the CERCLA and SARA regulations. These regulations require that a selected site remedy be protective of human health and the environment, cost-effective, and in accordance with other statutory requirements. Current EPA policy also emphasizes permanent solutions incorporating on-site remediation of hazardous waste contamination whenever possible. Final selection of a remedial alternative will be documented in the Record of Decision (ROD) only after consideration of all comments received by EPA during the public comment period and addressed in this responsiveness summary.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

Local residents reported buried drums at the Ewan Property site in 1982 to the Burlington County Health Department and NJDEP. Subsequently, residents have held numerous meetings, signed petitions, and written letters to federal, state and local officials requesting cleanup of the site.

In February 1983, more then 100 residents participated in a meeting to discuss the site and how to get a government agency to cleanup the site. A petition with 92 signatures was circulated by the Coalition Against Toxics to the federal congressional delegation to request the Ewan Property site be cleaned up. The Shamong Township Board of Education also requested help in developing an educational campaign for area school children about the Ewan Property site.

The primary concerns citizens have raised about the site include:

- Alleged decreases in property values of 10-15% that residents feel occurred as a result of the Ewan Property site.
- Potential contamination of potable wells if the contaminated groundwater spread to the residential areas.
- Potential health risks associated with exposure to contaminants leaking from the buried drums.

III. SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS

Comments raised during the public comment period for Ewan Property site are summarized below. The public comment period was held from July 31, 1988 to September 12, 1988 to receive comments on the draft supplemental RI/FS report and the Proposed Remedial Action Plan. Comments received during the public comment period are summarized below and organized into three categories: liability for cleanup costs, remedial investigation results, and future activities.

A. Liability for Cleanup Costs

Comment:

A resident inquired whether potential responsible parties (PRPs) had been identified and if the cleanup of the Ewan Property site might be delayed by the PRP's?

EPA Response:

EPA has notified several PRP's of their potential liability with respect to the site and is currently negotiating with one of these PRPs. As with any cleanup action of this type, EPA will offer the PRPs the option of undertaking the cleanup action. EPA prefers the PRPs to directly fund and conduct the cleanup, so that Superfund resources can be used for abandoned sites where PRPs cannot be identified. However, EPA will not delay the cleanup process pending an agreement with the PRPs.

Comment:

Several residents were interested in determining if EPA considered Shamong Township to have any liability for site cleanup.

EPA Response:

EPA is not aware of any potential liability by Shamong Township.

B. Remedial Investigation Results

Comment:

A resident inquired as to the depth of test borings conducted as part of the remedial investigation.

EPA's Contractor Response:

The deep wells (approximately 60-80 feet deep) were constructed to the bottom of the Cohansey and the top of the Kirkwood Aquifers. Contamination was not detected in this portion of the aquifer. However, contamination was detected in the shallow wells installed at the top of the Cohansey Aquifer (approximately 30 feet deep).

Comment:

One citizen inquired how deep the drums that were found during the remedial investigation were buried?

EPA Response:

The drums are buried near the surface and to a maximum depth of 10 feet.

Comment:

A resident wanted to know the nature of the waste found in Area B during the remedial investigation.

EPA's Contractor Response:

The waste identified in Area B during the remedial investigation consisted of domestic trash, plastic containers, and garbage bags.

Comment:

A resident asked about a pit that was alleged to be on site.

EPA Response:

A pit identified by a confidential source was located in Area A. Excavations were made in the pit and soil borings was conducted during the remedial investigation. The analytical results of the samples collected during the pit excavation and soil boring program indicate that contamination is not present in the pit.

Comment:

A resident inquired about the potential impact of an archeological study to be conducted as part of the supplemental investigation.

EPA Response:

An archeological investigation is planned to be conducted during the supplemental investigation but the archeological investigation should not hinder the cleanup effort.

Comment:

A resident asked if there were specific cleanup standards for groundwater quality in the Pinelands which were applicable to the Ewan Property site.

EPA Response:

The State of New Jersey has recently proposed drinking water standards under A-280 legislation that are more restrictive then federal standards. EPA intends to use the New Jersey standards unless the Pinelands Commission imposes something more restrictive.

C. Future Activities

Comment:

A resident expressed concern that funds might not be available to complete the cleanup action at the site.

EPA Response:

The funding for each phase (investigation, design, and cleanup) of the Ewan Property site is appropriated independently prior to initiation of each phase. Independent appropriation of funding by phase prevents a project from running out of funding prior to completion of each phase. While this process prevents a project from running out of funding midway through a phase, it does not guarantee funding will be available for each phase of the cleanup. At this time, however, EPA does not expect funding of any phase of the project to be a problem. Additionally, the New Jersey Congressional delegation has consistently ensured adequate funding to complete remedial actions at Superfund sites in New Jersey.

Comment:

One citizen who resides adjacent to the Ewan Property site expressed concern about potential traffic disruption and safety problems that might arise from the installation of the proposed fence and increased truck traffic during the remedial action.

EPA Response:

Plans for the fence and transportation impacts will be considered during the design phase. Interested citizens were welcomed and encouraged to share their ideas on the most efficient, safest, and least disruptive way to implement the proposed remedial action.

Comment:

One resident wanted to know if EPA would provide continued updates on site activities once the ROD was signed.

EPA Response:

EPA expressed its continued support for active public involvement at the site and stated that it would provide formal updates on the design plans and the results of the supplemental studies as information becomes available. EPA also, restated their willingness to meet formally or informally with any interested citizen.

Comment:

Several residents expressed an interest in the schedule for the cleanup.

EPA Response:

Once a ROD is signed a design contractor will be hired. Concurrently, the supplemental groundwater investigations will be conducted. The design phase and supplemental investigations could take approximately one year. EPA will then hire a contractor to actually remove the drums and contaminated soil and another contractor to design the selected groundwater remedial action. Subsequently, a cleanup contractor for the groundwater contamination design phase will be hired. A very rough ballpark figure of four or five years was estimated for the entire cleanup action.

Written comments submitted to EPA during the public comment period are attached as Appendix A.

IV. REMAINING CONCERNS

Concerns raised by the community about remedial activities at the Ewan Property site will continue to be important issues. The primary reason for continued concern is that the site is broken up into two distinct operable units and identical issues may resurface during the RI/FS process for the second operable unit.

In addition, a number of concerns that are directly related to the groundwater contamination to be addressed in the RI/FS of second operable unit were expressed. The issues which should be considered during the supplemental investigations of the second operable unit are summarized below:

Phase II Groundwater Investigations

Comment:

A number of residents were interested in the schedule for sampling of residential wells.

EPA Response:

The wells will be resampled as part of the Phase II remedial investigation during the next few months. Results of individual well sampling will be forwarded to the affected residents as soon as the results are validated. This process takes several months.

Comment:

A realtor expressed interest in the potential for the groundwater flow direction to be changed by increased pumping of the groundwater.

EPA Response:

Massive pumping of a large municipal-size wellfield at other sites has been known to trigger some changes in groundwater flow patterns, the volume and flowrate of private wells near the Ewan Property site should not cause any change in groundwater flow patterns. Additionally, groundwater studies at the Ewan Property are expected to be completed sometime next year which will likely result in a decision to pump and treat the contaminated groundwater thus permanently removing the contaminants.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

SEP 27 1988

Mr. H. John Phelps, III
Superfund Administration Executive
Chrysler Corporation
Plant Engineering and Environmental Planning
12000 Chrysler Drive
CIMS 416-15-14
Highland Park, MI 48288-1919

Dear Mr. Phelps:

This is in response to your letter of September 12, 1988, in which you provided comments to me related to the Ewan Property Remedial Investigation, Feasibility Study and Proposed Remedial Action Plan for the first operable unit remediation. Also, attached with your letter were comments raised by your consultant Roy F. Weston Incorporated. I have enclosed a copy of the EPA response to your concerns, which has been prepared with assistance from our contractor NUS Corporation. I have further addressed one specific concern below.

Roy F. Weston, Incorporation has indicated that six bulk samples of the potentially 8000 drums buried at the Ewan Property is not a significant sample quantity. The remedial investigation indicates that in several of the test pits, drums of poor structural integrity were encountered. This would indicate that some of the previously drummed waste has leaked into the surrouding environment. It is our judgement that Target Compound List analytes detected in the nearby soil and groundwater provide an indication of the general type of waste buried at the Ewan Property.

I hope that this clarification and the enclosed response will address your concerns.

Sincerely yours,

Craig De Biase

Craig De Biase, Project Manager
Southern New Jersey Remedial Action Section

Enclosure

September 19, 1988
NUSP/88-1190
N/A

Mr. Craig DeBiase
U S Environmental Protection Agency
26 Federal Plaza
Room 710
New York, New York 10278

Subject: REM III PROGRAM - EPA CONTRACT 68-01-7250
EWAN PROPERTY SITE, NEW JERSEY
RESPONSE TO CHRYSLER COMMENTS

Dear Mr. DiBiase:

The REM III Team has reviewed and responded to the comments Roy F. Weston, Inc. (Weston) prepared for Chrysler Motors (Chrysler) regarding the Remedial Investigation/Feasibility Study (RI/FS) at the Ewan Property Site. Generally, Chrysler concurs with the conclusion of the FS. Since the comments are not numbered, the responses are focused on the most relevant issues addressed in the various sections of the Weston report.

If you have any questions or need additional information, please contact me.

Very truly yours,

Debra M Wroblewski

Debra M Wroblewski
Site Manager

DMW/jdc

Attachment

cc: D Sachdev, Ebasco Region II
P Alessio, NUS
L Johnson, NUS
D Knapp, NUS
File: W A No. 130-2LA5 (691Y/344)

ial Investigation Objectives

Paragraph 1 - The estimate of the number of drums supported by both verbal reports and by geophysical surv data. The geophysical data used to support the estimate attached to this response. Also the "parties familiar wi the site" are not unknown. The information was obtaine from confidential sources whose names will not appear i the RI or FS reports.

Paragraph 2 - REM III agrees that "the selection of appropriate disposition methods for drum contents may vary depending on their nature (organic or inorganic) and physical state (solid or liquid)." Sampling additional drums would provide information on those particular drums, not those drums surrounding them or in the next trench. Inevitably, all drums must be excavated and characterized to determine their contents. Also, the cost estimates presented in the FS include contingencies for drum breakage and excavation of drums in the saturated zone (i.e., dewatering, etc.).

Feasibility Study Objectives

The FS for Operable Unit One focuses on remediation of the drums and the material in direct contact with the drums. The contaminated soils and groundwater will be addressed in the Operable Unit Two FS Report. Treatability studies are being conducted on the soils and the results will be included in the FS for Operable Unit Two.

The Weston comments suggest that "the appropriate waste characterization" be conducted prior to excavating the drums. Since no formal records of drum contents are available, REM III's judgment is that characterization of each drum is appropriate. During excavation, actions will be taken to limit the potential for drum leakage into the groundwater (i.e., dewatering, etc.). The conclusions of the Operable Unit One FS Report will be considered when preparing the FS for Operable Unit Two so that site remediation is conducted efficiently.

4.0 Site Investigation

Bullet One: Geophysical Surveys - The geophysical surveys were conducted in accordance with the Work Plan and Site Operations Plan. At that time, it was determined that the techniques used were appropriate.

Bullet Two: Test Pit Operations - Locating the test pits based on soil gas, geophysical, and visual information was not "ineffectiva". Drums were encountered in four (10, 13, 15, 16) metal shards in one (11) bog iron in one (8), one test pit (9) was excavated as a background check, and one was excavated to investigate the reported presence of buried fiberglass resins (12). Only one test pit (14) was excavated based upon the magnitude of a magnetic anomaly without encountering drums or visible signs of bog iron (See Appendix B of the RI Report).

Bullet Three: Subsurface Investigation - The soil contamination will be addressed in the Operable Unit Two FS. Weston is referring to Figure 3-6; this figure is a composite of information obtained during the RI. Although the analytical data indicates that several soil samples within the "estimated contaminated area" do not exhibit contamination, the fact remains that these locations are adjacent to either visual surface evidence of drums or near test pits which exhibited contamination or contained drums. Estimates included in the RI and FS are typically conservative; therefore, we cannot eliminate these areas.

Sample EP-SO-013-M does contain high levels of lead; this location was above a drum. Weston's reference to a provision for addressing such heavy metals refers to the FS and not the Site Investigation. Costs have been allocated in the FS for handling ash which may contain metals.

Bullet Four: Soil Gas Survey - The soil gas survey was conducted as part of the interim activities prior to preparing the Site Operations Plan (SOP) for planning the RI field activities. The detailed procedure was included in the SOP, as stated on page 25 of the RI. As part of the evolution of this RI Report, it was determined that the description included on pages 24 and 25 were sufficient for the inclusion in the RI Report.

A visual representation of the results of the soil gas are included in the text on Figures 3-1 and 3-2. The visual representation of data in the text has been supported by the details provided in the Appendix. Also, pH and conductivity were conducted as part of the soil gas screening.

5.0 Endangerment Assessment

Bullet One: Vapor Suppression - This statement is true and has been considered in the remedial alternatives presented in the FS Report.

Bullet Two: The closest downgradient residential well is located approximately one mile from the site; however, the closest downgradient potable well is located at the Shamong Field House. The 920 meters refers to the field house and not the nearest downgradient residence.

The flow in the Cohansey sand aquifer ranges from 50 to 124 feet per year. In order to provide a conservative estimate the value of 124 feet per year was used for calculations.

Bullet Three: There is "no immediate and substantial hazard presented by the soils and buried waste materials". This was a similar conclusion stated by Weston in a 1984 report prepared as the TAT contractor for the EPA. If there were an immediate and substantial hazard, a removal action would have been undertaken, not the formal RI/FS proceedings. Inactivity with regard to expeditious source mitigation will allow the potential for further soil and groundwater degradation.

6.0 Feasibility Study

Validity/Integration of Operable Units

An immediate removal action, based upon protection of the public health and the environment, is not warranted, as stated by Weston. This is the reason remedial activities evaluations were performed. The Operable Unit approach was established to expedite the remediation of the site. The longer the drums remain in the ground the more difficult and costly soil and groundwater remediation will become. It will also become more difficult to excavate the drums as they continue to rust and become more fragile. Weston suggests that drum removal may exacerbate contaminant levels and migration potential in the groundwater. It is REM III's judgment that expeditious source mitigation will prevent continued degradation of the soil and groundwater. Precautions will be taken during excavation activities to limit the potential for source material to further contaminate the soils and groundwater.

Apparently a further clarification is required. The FS for Operable Unit Two is presently being conducted and will be issued once treatability studies on the soils are completed. The Operable Unit Two FS will concentrate on the lesser contaminated soil and groundwater remediation activities. These remedial activities will provide for a protective, expeditious, and cost effective overall site mitigation.

Technology/Alternative Screening Process

A statement on page 49 indicates that the alternatives for remediation of Operable Unit One are interim measures. This was written to indicate that the entire site will not be remediated as part of Operable Unit One and that contamination would remain at the site to be remediated under Operable Unit Two.

The alternatives evaluated do include temporary storage (following over-packing, stockpiling, and testing). REM III realizes that some portion of the material may not be suitable for incineration or may better be treated by other means. However, until all source material is excavated and characterized this issue cannot be truly evaluated. The REM III RI indicates that the majority of the source material disposed of at the site is suitable for incineration.

Weston also states that "technologies which might be equally protective, particularly in the context of a comprehensive site remedial alternative, were not selected for evaluation." Weston provides a list of these technologies at the end of the package. Incineration of the source material may be more universally applied than in-situ volatilization, stabilization, etc.

Volume Estimation

REM III agrees that assumptions have been made; however, firm estimates cannot be obtained until all of the source material is excavated. What was suggested was to obtain information on exact numbers of drums which contain liquids, how many have leaked, etc., by conducting a large scale test pit operation. The information obtained from this operation would be limited to the exact drums sampled and the trenches investigated. However, costs and time incurred for additional RI activities could be better utilized in beginning the site remediation.

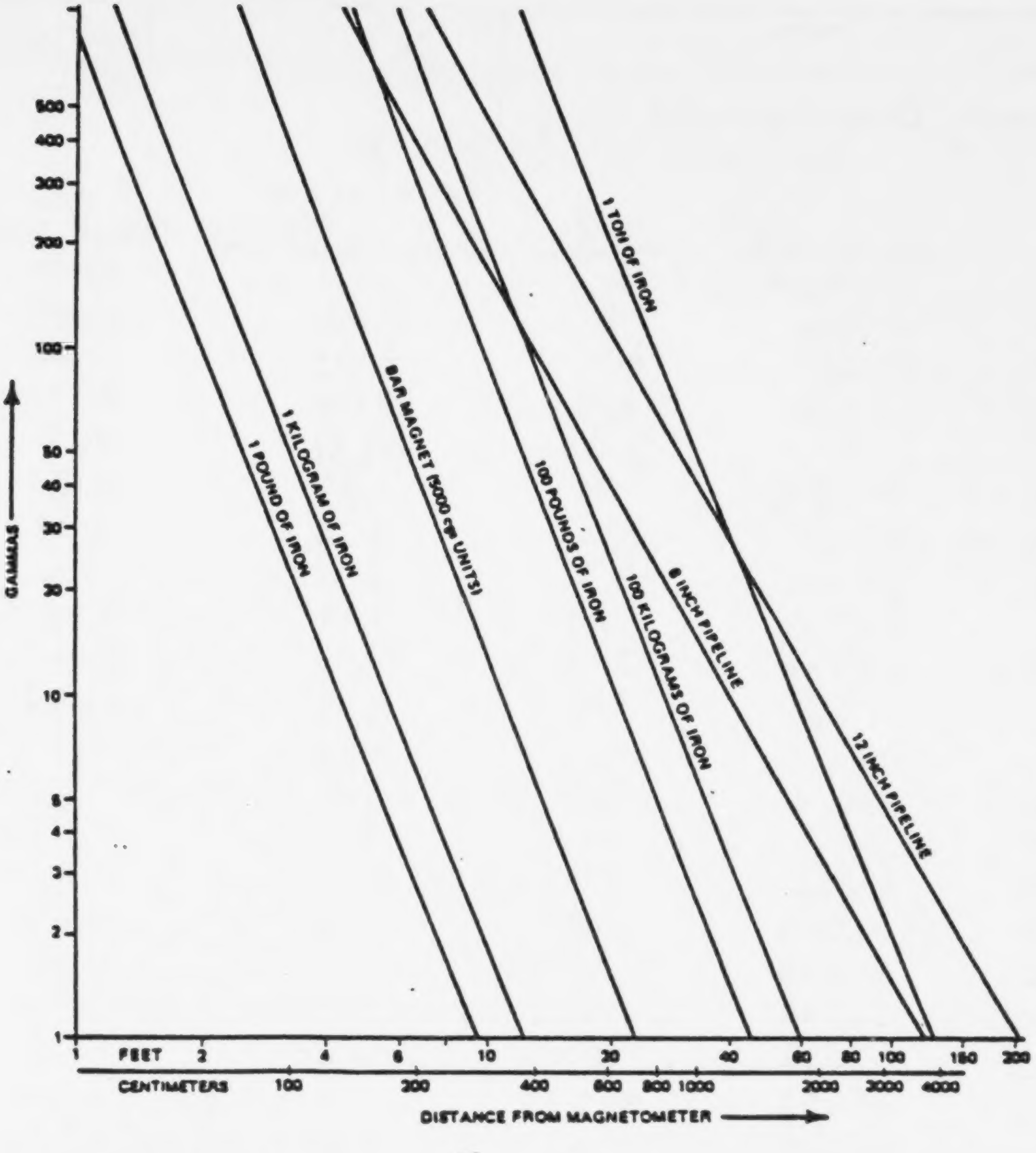
Validity of Incineration

Based upon information that REM III has obtained during the RI, incineration is appropriate for the majority of the source material. It is conceivable that portions of the material would not be suitable for incineration or that other treatment options would be more effective. This potential issue will be addressed if it occurs.

Other Potentially Viable Technologies

Weston lists several technologies which may prove to be appropriate for a portion of the source materials. As noted by Weston, incineration was selected as a technology which may be appropriate for the majority of the source materials.

Nomogram for Estimating Anomalies from Typical Objects (assuming dipole moment M = 5 X 10^5 cgs/ton, i.e., k = 8 cgs. Estimates valid only within order of magnitude)



INSTRUCTIONS FOR USE:

To use the nomogram, select a given weight or type of object from among the diagonal labeled lines. Then choose a distance along the bottom line (abscissa) of the graph and follow a vertical line upwards from that distance until it intersects the diagonal line of the selected object. At that point, move horizontally to the left to a value on the vertical axis (ordinate) of the graph and read the intensity in gammas.

At a given distance, the intensity is proportional to the weight of the object. Therefore, for an object whose weight is not precisely that of the labeled lines, simply multiply the intensity in gammas by the ratio of the desired weight to the labeled weight on the graph. If the distance desired does not appear on the graph, remember that for a typical object the intensity is inversely proportional to the cube of the distance and for a long pipeline the intensity is inversely proportional to the square of the distance between magnetometer sensor and object. Due to the many uncertainties described herein, the estimates derived from this nomogram may be larger or smaller by a factor of 2 to 5 or perhaps more.

FIGURE 3-6

NOMOGRAM USED FOR DRUM ESTIMATE CALC
EWAN PROPERTY SITE, SHAMONG TWP., NJ

NUS CORPORATION
A Halliburton Company

NUS CORPORATION AND SUBSIDIARIES | **STANDARD CALCULATION SHEET**

CLIENT: USEPA	FILE NO.: 691Y	BY: DRF	PAGE 1 OF 3
SUBJECT: Ewan Property Drum Estimate		CHECKED BY:	DATE: 2/3/[illegible]

Background is 54,800 γ

Coordinates X	Y	Reading (γ)	Δγ	Estimated # of drums (Δγ/59)	# Drums @66% factor
550	775	54,866	66	1.1	0.74
300	625	54,802	2	0.03	0.02
575	575	55,214	414	7.03	0.63
550	575	56,630	1830	31.02	20.47
475	575	57,131	2331	39.51	26.1
475	550	54,876	76	1.29	0.85
575	550	55,134	334	5.66	3.74
550	525	55,712	912	15.46	10.2
525	525	54,870	70	1.19	0.78
525	500	55,577	777	13.17	8.69
550	[illegible]	55,776	976	16.4	10.82
[illegible]	[illegible]	55,235	435	7.37	4.[illegible]
475	475	55,517	717	12.2	[illegible]
450	475	55,241	441	7.47	4.93
550	475	55,855	1055	17.88	11.8
275	450	55,024	224	3.8	2.51
[illegible]	750	56,505	1705	28.9	19.07
575	450	55,056	256	4.34	[illegible]
300	425	57,352	2552	43.25	28.55
675	425	55,597	797	13.51	[illegible]
325	400	55,230	430	7.29	4.8[illegible]
550	400	57,168	2368	40.14	[illegible]
575	400	59,909	5109	86.59	57.[illegible]
450	375	56,747	1947	33	21.78
425	375	55,930	[illegible]	[illegible]	[illegible]
350	350	56,416	1616	27.39	18.08
425	350	54,825	25	0.42	0.28
450	350	55,701	901	15.27	10.[illegible]
525	350	55,591	591	10.02	[illegible]
450	325	55,128	328	5.56	3.67
425	325	60,088	5288	89.18	59.13
[illegible]	325	55,079	279	4.73	3.12
350	325	56,012	1212	20.54	13.56

NUS CORPORATION AND SUBSIDIARIES — STANDARD CALCULATION SHEET

CLIENT: USEPA	FILE NO.: 691Y	BY: DRF	PAGE 1 OF 3
SUBJECT: Ewan Property Drum Estimate		CHECKED BY:	DATE: 2/3/[illegible]

Background is 54,800 γ

Coordinates X	Coordinates Y	Reading (γ)	Δγ	Estimated # of drums (Δγ/59γ)	# Drums @ 66% factor
550	775	54,866	66	1.1	0.74
300	625	54,802	2	0.03	0.02
575	575	55,214	414	7.03	0.63
550	575	56,630	1830	31.02	20.47
475	575	57,131	2331	39.51	26.1
475	550	54,876	76	1.29	0.85
575	550	55134	334	5.66	3.74
550	525	55,712	912	15.46	10.2
525	525	54870	70	1.19	0.78
525	500	55,577	777	13.17	8.69
550	[illegible]	55767	967	16.4	10.82
[illegible]	[illegible]	55229	429	7.27	4.8
475	475	55517	717	12.2	[illegible]
450	475	55241	441	7.47	4.93
550	475	55855	1055	17.88	11.8
275	450	55024	224	3.8	2.51
[illegible]	750	56505	1705	28.9	19.07
575	450	55056	256	4.34	[illegible]
300	425	57352	2552	43.25	28.55
475	425	55597	797	13.51	[illegible]
325	400	55230	430	7.29	4.81
550	400	57168	2368	40.14	26.49
575	400	59909	5109	86.59	[illegible]
450	375	56747	1947	33	21.78
425	375	55932	1132	20.03	[illegible]
350	350	56416	1616	27.39	18.08
425	350	54865	65	0.42	0.28
450	350	55701	901	15.27	10.08
525	350	55591	591	10.02	[illegible]
450	325	55128	328	5.56	3.67
425	325	60088	5288	89.18	59.15
375	325	55079	279	4.73	3.12
350	325	56012	1212	20.54	13.56

NUS CORPORATION AND SUBSIDIARIES | STANDARD CALCULATION SHEET

CLIENT: USEPA	FILE NO.: 691Y	BY: [illegible]	PAGE 2 OF 2
SUBJECT: Ewan Property Drum Estimate		CHECKED BY:	DATE: 8/[illegible]

Coordinates X	Coordinates Y	Reading (γ)	Δγ	Estimated drums = (Δγ/59γ)	# drums @66% [illegible]
200	325	59,605	4805	81.44	53.75
175	325	56,026	1266	20.78	13.71
200	125	54,864	64	1.08	0.72
200	100	60,627	5827	98.36	65.18
225	100	55,123	323	5.47	3.61
200	75	55,[illegible]4	354	6.	3.96
50	75	54,467	67	1.14	0.75
25	75	61,451	6651	112.7	74.4
225	25	58,436	4036	68.41	45.15
225	0	59,471	5071	85.95	56.73

Background is 54,400 γ

50	300	54,818	418	7.08	4.68
75	300	54,614	214	3.63	2.40
100	300	55834	1434	24.31	16.04
150	300	54,963	563	9.54	6.30
175	300	55336	936	15.86	10.47
250	300	55269	869	14.73	9.72
300	275	54627	227	3.85	2.54
250	275	54928	528	8.95	5.91
100	275	55021	621	10.53	6.95
50	275	54,665	265	4.50	2.96
175	250	55818	1418	24.03	15.86
300	225	54,614	214	3.63	2.40
275	225	54,730	330	5.60	3.69
250	225	54885	485	7.76	5.12
175	225	54971	571	9.68	6.39
100	225	54976	576	9.76	6.44
75	225	54687	287	4.86	3.21
100	200	55114	714	12.10	7.99
225	200	54778	378	6.41	4.23

[illegible]nates — Dr[illegible] Estimate

BY: DRO
CHECKED BY:

X	Y	Read (X)	ΔX	Estimated % of damage (28/592)
225	175	5[illegible]76[illegible]	324	5.49
200	175	57737	3337	56.56
150	175	54801	401	6.8
125	175	54975	575	9.75
100	175	55404	1004	17.02
75	150	5[illegible]7[illegible]4	324	5.49
100	150	54611	[illegible]	7.08
200	150	57653	258	4.37
220	150	5[illegible],626	252	4.27
275	150	5[illegible]295	5195	88.05
[illegible]75	[illegible]25	5[illegible]629	[illegible]	4.03
[illegible]50	125	5[illegible]419	1039	17.61
225	125	5[illegible]54[illegible]	1145	19.41
[illegible]00	125	54864	464	7.86
75	125	54708	308	5.22
[illegible]75	100	54691	271	4.72
125	100	54659	629	4.[illegible]
175	100	54740	340	5.76
200	100	60627	6227	100.31
225	100	55123	72[illegible]	10.65
250	100	54641	[illegible]71	4.08
125	75	54681	289	4.9
100	75	54666	[illegible]66	4.43
50	75	54867	467	7.72
25	75	61451	119.51	173.59
150	50	54722	[illegible]	5.46
225	50	54706	306	[illegible].93
275	50	54714	314	5.32
250	25	54600	200	[illegible].39
225	25	588[illegible]6	[illegible]436	75.19
200	25	54781	381	6.46
150	25	54621	221	3.74
225	0	59871	5471	92.73
50	0	54723	3[illegible]3	5.47

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[illegible]
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3.9[illegible]
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4.26
[illegible]
61.[illegible]
[illegible]
1337.41

NUS 1964 REVISED 02/85

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575	800	54619.6
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625	800	54651.7
650	800	54601.5
675	800	54316.5
700	800	54496.3
725	800	54719.6
725	775	54577.8
700	775	54309.1
675	775	54736.2
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625	775	54494.6
600	775	54392.1
575	775	54417.7
550	775	54866.3
525	775	54597.6
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475	775	54687.3
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475	750	54482.3
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725	750	53973.6
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APPENDIX A

PUBLIC COMMENTS

TOWNSHIP OF SHAMONG
BURLINGTON COUNTY, N.J.
Office of the Township Clerk
60 Willow Grove Road
Vincentown, NJ 08088

(609) 268-2377

ENVIRONMENTAL PROTECTION
AGENCY, REGION II
1988 SEP -6 AM 7:33
ERRD-NJ REMEDIAL ACTION
BRANCH

August 31, 1988

Craig DeBiase
Project Manager
U.S. Environmental Protection Agency
26 Federal Plaza
Room 711
New York, New York 10278

Dear Mr. DeBiase:

The Shamong Township Committee recommends Remedial Alternative 2 for the Ewan Property Site, Shamong Township, New Jersey.

Of the three remedial alternatives discussed at your public meeting of August 18, 1988, and a review of the material filed at the Municipal Building, Remedial Alternative 2 will correct the hazardous waste site with the least negative effect on the environment. Alternative 1 is not acceptable because the environment will continue to be damaged by the hazardous waste. On site burning as described in Alternative 3 raises servious health and safety concerns for our residents as well as environmental concerns.

Thank you for arranging the public meeting and we look forward to our continued cooperation.

Yours truly,

L. E. Heinold
Township Clerk

LEH:bv

cc: Township Committee

TOWNSHIP OF SHAMONG
BURLINGTON COUNTY, N.J.
Office of the Township Clerk
60 Willow Grove Road
Vincentown, NJ 08088

(609) 268-2377

ENVIRONMENTAL PROTECTION AGENCY, REGION II
1988 SEP -6 AM 7:33
ERRD-NJ REMEDIAL ACTION BRANCH

August 30, 1988

Craig DeBiase
Project Manager
U.S. Environmental Protection Agency
26 Federal Plaza
Room 711
New York, New York 10278

Dear Mr. DeBiase:

As Mayor of Shamong Township I want to go on record as supporting Remedial Alternative 2 for the Ewan Property Site, Shamong Township, New Jersey.

Remedial Alternatives 1 and 3 raise serious environmental, as well as, health and safety concerns.

If there is anything I can do to help expedite Remedial Alternative 2, please do not hesitate to contact me.

Yours truly,

Richard O. Erisman, Jr.
Richard O. Erisman
Mayor

ROE:bv

Bunker Hill Rd. • R.D. #5 • Vincentown, NJ • 08088 • 609-654-2549

ENVIRONMENTAL PROTECTION
AGENCY, REGION II

1988 SEP -7 AM 8 03

ERRD-NJ REMEDIAL ACTION
BRANCH

Shamong
MANUFACTURING COMPANY, INC.
PRECISION SHEET METAL

1 SEPTEMBER 1988

CRAIG DE BIASE
PROJECT MANAGER
U.S. ENVIRONMENTAL PROTECTION AGENCY
26 FEDERAL PLAZA
ROOM 711
NEW YORK, N. Y. 10278

SUBJECT; EWAN PROPERTY
SHAMONG TOWNSHIP NEW JERSEY
LOT 32.01, 32.02 BLOCK 5

I WOULD LIKE TO COMMEND MR. JOHN FRISCO AND THE AGENCY ON THE DECISION TO REMOVE ALL HAZARDOUS WASTE AND CONTAMINATED SOILS AT THE PROPERTY SITE.

Donald Autio
DONALD AUTIO
SHAMONG TOWNSHIP PLANNING BOARD

9/12/88

CHRYSLER MOTORS

Chrysler Motors Corporation
Chrysler Center

September 12, 1988

Mr. Craig DeBiase
Project Manager
U. S. Environmental Protection Agency
26 Federal Plaza, Room 711
New York, New York 10278

Dear Mr. DeBiase:

Subject: Ewan Property Site, Shamong Township, Burlington County, New Jersey

This letter, together with the attached technical analysis by Weston Engineering, constitutes Chrysler Motors' comments on the Remedial Investigation and Feasibility Study ("RI/FS") report for the Ewan Property Superfund site in Shamong Township, New Jersey. Chrysler's specific comments and concerns about technical aspects of the RI/FS, on which the Proposed Remedial Action Plan ("PRAP") is based are set forth in the attachment. The purpose of this letter is to provide an overview of Chrysler's position on the PRAP and underlying documents.

In general, Chrysler concurs with the Agency's proposal to utilize a combination of off-site incineration and waste treatment as a remedy for the first operable unit at the site. Indeed, as Chrysler representatives have discussed with EPA, Chrysler may be interested in undertaking remedial action at the site, under EPA's oversight. Chrysler's active involvement in implementing the remedy will facilitate timely and efficient remediation of the site.

Although Chrysler agrees with the fundamental remedial approach set forth in the PRAP, Chrysler is concerned because the final remedy set forth in the PRAP does not provide for on-site technical judgments regarding which materials will require incineration, and which may be more appropriately handled by other methods. As is explained in more detail in the attached technical comments, a flexible approach is necessary due to the lack of reliable waste characterization data, and because the data that is available for the site is suspect in many crucial respects. Waste characterization activities conducted as part of the remedial effort, for example, may reveal that some of the materials potentially located at the Ewan property are not hazardous because they had been treated prior to disposal.

12000 Chrysler Drive
Highland Park MI 48288-1919

In view of the foregoing uncertainties, it is important that the Record of Decision ("ROD") describe the selected remedy in general terms and that it provide for flexibility in the implementation of the remedy. In particular, the ROD should provide for an on-site waste characterization process followed by an on-site determination as to which of the materials should be incinerated and which may be handled by other appropriate methods. These on-site activities should be conducted by the remediation contractor with the assistance of the on-scene EPA coordinator.

This approach is consistent with the PRAP and should require only minor changes in the ROD. To assist in implementing the approach described above, Chrysler suggests that language along the following lines be used to describe the selected remedial alternative:

> Excavation and off-site thermal destruction of waste and/or treatment of waste would involve a three-step process. First, waste materials (i.e., drummed waste and materials in contact with drums) shall be identified and sampled. Second, all drummed waste and materials in contact with drums shall be evaluated on-site to determine the level of hazardous substances present and to select the appropriate remedial method to be used for those materials. Third, hazardous wastes identified as appropriate for incineration will then be transported off-site to a designated thermal destruction facility, while materials identified as inappropriate for incineration will be treated with the most appropriate remedial technology. Such appropriate technologies may include on-site treatment during the second operable unit of remediation, off-site treatment at a licensed hazardous waste treatment facility, pilot studies of potential treatment methods, or equivalent measures. Materials identified as non-hazardous during the on-site characterization process will be handled as appropriate in light of their non-hazardous nature.

The matters discussed above are analyzed in greater technical detail in the attached comments by Weston Engineering. In particular, the Weston analysis identifies why the investigations of the volume of drums potentially present at the site and of the contents of those drums have been inadequate. The Weston comments also discuss deficiencies in the technology screening and alternatives analysis, which arbitrarily excluded any in depth consideration of non-thermal treatment approaches. Those comments further explain why the RI/FS' lack of reliable data means that exclusive reliance on thermal destruction as a remedial approach for the first operable unit is not justified, and why allowance for alternative treatment approaches following more definitive waste characterization is required.

Chrysler appreciates the opportunity to comment on the PRAP and RI/FS, and looks forward to continuing to work with the Agency to resolve all the issues at the Ewan property site.

Sincerely,

H. John Phelps, III

Enclosure
PW/PE&EP/08

REVIEW ON RI/FS
FOR
EWAN PROPERTY SITE
SHAMONG TOWNSHIP, NEW JERSEY

Prepared by

ROY F. WESTON, INC.

September 1988

1.0 EXECUTIVE SUMMARY

2.0 INTRODUCTION

3.0 OVERVIEW

- Remedial Investigation Objectives
- Feasibility Study Objectives

4.0 SITE INVESTIGATION

5.0 ENDANGERMENT ASSESSMENT

6.0 FEASIBILITY STUDY

- Validity/Integration of Operable Units
- Technology/Alternative Screening Process
- Volume Estimation
- Validity of Incineration
- Waste Characteristics
- Other Potentially Viable Technologies

7.0 CONCLUSIONS AND RECOMMENDATIONS

1.0 EXECUTIVE SUMMARY

Roy F. Weston, Inc. (WESTON) has reviewed the Remedial Investigation (RI) and Feasibility Study (FS) Reports prepared by U.S. EPA Contractors on the Ewan property Site in Shamong Township, Burlington County, New Jersey. WESTON has completed the review of the RI/FS reports and concentrated on the following items:

- Validity of the technical approach.
- Consistency with applicable regulations and guidance.
- Sufficiency of the RI data base to develop remedial alternatives.
- Technical consistency of the evaluation/selection of remedial alternatives with the findings of the RI.

WESTON's key findings from the review of the RI are enumerated below:

- The geophysical survey was not performed using techniques that are more applicable to the site conditions.
- There is insufficient information on the contents of the drums since only two drum samples were collected during the RI, and only six have been sampled during all investigations.
- Insufficient information was collected on the physical condition and spatial distribution of the drums.
- No attempt was made to collect verifiable field information on the volume of "highly contaminated" soils adjacent to the drums.
- The Remedial Investigation, therefore, did not achieve the objective of developing a sufficient data base for evaluation of all remedial alternatives in the FS.

The Feasibility Study divides the Remedial Action into two Operable Units. Operable Unit No. 1 addresses the remediation of the buried drums and the adjacent "highly contaminated" soils and Operable Unit No. 2 address the remediation of the remaining contaminated soils and on-site groundwater. The Feasibility Study, reviewed by WESTON, addresses Operable Unit No. 1. The following key findings were developed from WESTON's review of the FS:

- There is insufficient waste characteristic information to facilitate a comprehensive development and evaluation of technical alternatives.

- An expedited response of drum removal on the basis of an imminent and substantial hazard to the public health and the environment is not justified based on the information presented in the RI.

- Additional remedial alternatives should have been considered and evaluated.

- No attempt was made in the FS to integrate the two operable units to evaluate benefits which could be derived based on a combined approach.

- Cost information is not reliable due to insufficient data in the RI.

Based on our review of the RI and FS, WESTON recommends the following:

- Additional field investigations involving geophysics to locate and estimate quantities of drums. Soil and drum sampling should be conducted, in order to more accurately characterize and quantify the waste prior to drum removal.

- If an interim remedial action for Operable Unit 1 is performed, intermediate handling and ultimate disposition of the waste material should be flexible, based on the waste characteristics.

- Any interim remedial action should allow for future integration of the operable units, especially with respect to contaminated soils disposition.

2.0 INTRODUCTION

The Ewan Property Site is located in Shamong Township, Burlington County, New Jersey. The site was used for disposal of drums containing a variety of substances including solvents, resins etc. The site was the subject of investigation from the early 1980's by New Jersey Department of Environmental Protection (NJDEP), U.S. EPA's Field Investigation Team (FIT Contractor), U.S. EPA's Technical Assistance Team (TAT Contractor) and U.S. EPA's REM-FIT Contractor-NUS Corporation. The site is on the National Priorities List (NPL) and a remedial investigation was conducted by NUS Corp. in 1985-1986. Subsequently, the Feasibility Study for Operable Unit No. 1 at the site was issued by EBASCO in 1988. WESTON reviewed the RI/FS reports to achieve the following objectives:

- Evaluate the technical approach of the RI/FS for completeness and application of sound scientific/engineering principles.
- Evaluate the regulatory compliance of the RI/FS with CERCLA, SARA and related guidance documents.
- Evaluate if the data base generated during the RI was sufficient to perform a feasibility study.
- Evaluate if the selection and evaluation of alternatives is consistent with the findings of the RI and sound engineering principles.
- Evaluate if the findings of the RI provide valid evidence for requiring remedial action as proposed in the RI/FS.
- Evaluate if other remedial technologies/alternatives merit a detailed evaluation to address the remedial action at the site.

WESTON has completed the review of the reports and has addressed each of the above mentioned objectives. The ensuing sections of the report summarize the results of WESTON's review.

3.0 OVERVIEW

Remedial Investigation Objectives

The stated objectives of the Remedial Investigation (RI) performed by EBASCO are to: (1) define the nature and extent of contamination which presents a threat to the public health and the environment, and (2) obtain the information necessary to develop and evaluate remedial alternatives. The Ewan Property Site Remedial Investigation Report does not adequately fulfill these objectives. First, the RI does not sufficiently characterize the contents of the drums. Since only six total samples were taken from an estimated 500 to 8000 drums. Moreover, the estimate of the total number of drums (500 to 8000) is not supported by any factual data. The only identified source of this estimate is given as unknown "parties familiar with the site".

With respect to the gathering of information in support of the development of remedial alternatives in the Feasibility Study the RI likewise fails to provide the necessary critical data. Again the lack of information on the wastes contained in the drums and total number of drums is critical. The selection of appropriate disposition methods for the drum contents may vary drastically depending on their nature (organic or inorganic) and physical state (solid or liquid). The location and condition of drums will also effect the remedial alternatives development and these are as yet not adequately defined. The water table is within 6 to 10 feet of the ground surface and the possibility exists that a number of the drums may be in the saturated zone. This would greatly effect the progress of excavations necessary for drum removal.

Feasibility Study Objectives

The overall objective of the CERCLA Feasibility Study process is the identification of the most appropriate, cost effective alternative(s) for remediation of a site. The Ewan Property Site FS is focused on only the buried drums on-site and the adjacent "highly contaminated" soils. This does not appear to be appropriate, because adjacent soils may contain non-visible yet significant concentrations of the constituents of concern. More importantly the risk assessment identified the potential future use of groundwater as the only significant risk posed by the site. Based on the rate of groundwater movement in this area, the risk assessment indicates that groundwater impacts may occur 24 or more years in the future. Therefore, the immediate removal of drums does not appear to be justified based on potential short term threats to public health. The FS does not address the groundwater pathway at all. In fact, it is possible that the

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drum excavation, prior to the appropriate waste characterization program, could exacerbate the potential groundwater problem by causing corroded drums to spill during removal operations.

4.0 SITE INVESTIGATION

The site investigation activities included a soil gas survey, geophysics surveys, test pit installation, and environmental media sampling (soil, groundwater, sediment, surface water and air). The results of the investigation is a characterization of the present site contamination. There are several inadequacies regarding the activities conducted during the investigation.

- Geophysical Surveys: Electromagnetic conductivity (EM 34) and magnetic surveys were conducted of the site. Because the drums are reported to be near the surface, additional information could be obtained using an EM 31 model. The EM 31 has an effective depth of 15 feet. This data may be used to confirm the magnetometer survey. Another geophysical method which has proven effective for locating trenches or disturbed soil areas is Ground Penetrating Radar (GPR). Both the EM 31 and GPR might have been more effective in developing a more accurate estimate of the exact location and resultant volume of drums to be removed.

- Test Pit Operations: The location of test pits based on soil gas, geophysical and visual information was ineffective since only 4 of 9 test pits in Area A uncovered drums. Data correlating the location of drums with respect to the water table, the amount of contaminated soils surrounding the drums and the condition of the drums was not collected during the test pit operations. These were identified as the objectives of the test pit operation on page 29 of the RI report and they were apparently not addressed during the field investigation.

- Subsurface Investigation: The study was deficient in several respects. Several soil sampling locations which did not show evidence of contamination are included in the estimated contaminated area. Another soil boring sample (EP-SO-013-M) contained levels of lead (6%) and organic compounds; however, there appears to be no provision for addressing such heavy metals.

- Soil Gas Survey: The report does not provide a discussion of the analytical instruments used, the analytical methods or the field sampling procedures. The NUS procedure cited in the text is not provided in Appendix E. The results are normally presented in the text of the report not in an appendix. The usefulness of the survey is dependent on the procedures used, since these are not given no meaningful evaluation can be performed. Additionally, the information for pH and conductivity screening should be separated into another section. Presenting this information in the soil gas section confuses the issue.

5.0 ENDANGERMENT ASSESSMENT

In the Level 3 risk assessment that was performed for this site, there is insufficient detail regarding selection of the indicator chemicals. The following statements provide more detail of the major issues in the assessment:

- Air quality was not of concern during the field studies, as indicated in Section 6.0 of the RI. Hence, no ambient air sampling program was conducted as part of the RI. However, there was evidence of VOC's in the air in some of the test pits and monitor wells as measured by both OVA and PID. As a preponderance of indicator chemicals being volatile in nature, it may be expected that air quality could be affected during drum excavations. If large numbers of drums (e.g. in the thousands) are found, there may be a need for vapor suppression technology during active excavation remedial actions depending on the actual condition of the drums, type of materials found, and amount of liquid remaining in the drums.

- The risk assessment summary concludes that "the only significant risk posed is to potential future users of site groundwater." On page 131 of the RI it is noted that the closest resident to the south of the site (in the direction of groundwater flow) is 1 mile (920 meters). The value 920 meters was used in the risk assessment; however, one mile is 1,609 meters not 920 meters. In addition, at an estimated flow velocity of 99 feet per year for water at the top of the Cohansey Formation (p. 86) it would take 30.5 years to travel 920 meters or 53.3 years to travel 1 mile. Based on the information presented in the RI, there appears to be no immediate threat to the public health.

- Finally, in the risk assessment discussion of exposure pathways (p. 133 of the RI) the following statement is made:

  > "Presently there is no basis for assessing exposure or risk to on-site surface soils or waste materials. Although these materials are the source of environmental contamination, direct exposure under present site conditions is unlikely. A significant degree of soil disturbance at some time in the future may increase the potential for human health and environmental exposure."

This statement directly contradicts the focus of the Feasibility Study. There no immediate and substantial hazard presented by the soils and buried waste materials.

6.0 FEASIBILITY STUDY

The comments were limited to substantial issues which have a bearing on the selection of a remedy as follows.

Validity/Integration of Operable Units

The Feasibility Study was specifically designed to address only the buried drums and the adjacent visibly stained soils. These media were designated as an operable unit for the purpose of the FS and associated remedial actions. The designation of an operable unit is typically made to segregate and simplify the analysis of alternatives for discrete site areas/media in order to accelerate cleanup. The solution for one discrete operable unit should have little impact on the selection/performance of any other. If this is not true, the alternative analysis should then encompass the more comprehensive coupled areas/media in an integrated manner.

The identification of buried drums and visibly stained soils as an operable unit (Operable Unit No. 1) for this site does not appear to be appropriate, as the alternatives developed for Operable Unit No. 1 will impact the media to be addressed as Operable Unit No. 2 (i.e. residual soil contamination and groundwater contamination may increase due to waste handling). The distinction between visibly stained soils and contaminated soils is an artificial one relative to both the cleanup objectives and the appropriateness of technologies which will be considered for the different operable units as currently defined. In particular, technologies which may be employed for Operable Unit No. 2 remediation may be applicable to Operable Unit No. 1 remediation. This includes technologies not selected in the current FS.

The drum excavation alternatives developed and analyzed in the FS raises the concern that drum damage common to such activities will result in waste losses during the excavation to surrounding soil and groundwater. Due to the length of time the drums have been buried, acidic soils and high water table, the condition of the drums is highly suspect and waste losses must be anticipated. Such waste losses may not be visible or recoverable. Without a comprehensive approach to soil and groundwater cleanup concurrent with drum removal, these activities may actually exacerbate contaminant levels and migration potential in the groundwater.

Perhaps more importantly, the Endangerment Assessment identified groundwater transport to off-site groundwater users as the principal threat to public health. It conservatively estimated that such potential public health impacts would occur 24 (page 6, FS) or more years from the present. These results do not support an immediate removal or interim remediation focused upon drum removal based on protection of the public health and the environment. Groundwater, which was identified as the principal pathway, is not addressed in the FS.

Rather than enhancing protection of public health, the immediate removal of drums would more likely have value in minimizing the volume of contaminated soil which might occur if an intact drum were to leak prior to initiation of the comprehensive remedial action. This benefit may be outweighed by the inefficiency of deactivating the site and, potentially, subsequently returning to identify and remediate soils and groundwater with non-visible residual concentrations.

Based on these considerations, the FS should have been conducted on the basis of an integrated analysis of the previously defined Operable Units 1 and 2.

Further comments on the FS are oriented toward the existing FS basis focused on Operable Unit No. 1.

Technology/Alternative Screening Process

The technology screening and alternative analysis criteria used in the FS are generally consistent with current RI/FS guidelines with some exceptions.

In the FS at P. 49, it is stated that the alternatives for remediation of Operable Unit No. 1 are interim/expedited measures which do not have to meet all site cleanup requirements. Yet the screening and selection of technologies apparently did not allow for the selection of technologies or evaluation of alternatives that did not meet goals of reduction of mobility, toxicity and volume or did not represent a "final" solution. Since the characteristics of waste materials is, as yet, lacking, such "technologies" or approaches should have included temporary storage (following over-packing, stockpiling, and testing) and land disposal (for solid wastes which are more appropriately landfilled than thermally treated). The current FS alternatives only provide for thermal treatment or no action. Successful implementation of thermal treatment may be thwarted by the waste properties that are as yet uncharacterized. The selection of an alternative which provides for proper evaluation and for flexibility in routing waste materials to their ultimate treatment/disposition would enhance the probability of successful implementation.

Current guidance also allows for evaluation and selection of alternatives which do not meet ARARs if equivalent performance in protecting public health and the environment can be achieved. In this regard, technologies which might be equally protective, particularly in the context of a comprehensive site remedial alternative, were not selected for evaluation.

For all these reasons, the number of alternatives developed for analysis in the FS was insufficient.

Volume Estimation

The volume estimate of the material to be remediated for both Operable Units 1 and 2 is currently imprecise. Operable Unit 1 is estimated to contain 8000 drums, each one-half full, plus a volume of soil equal to 8000 drums. Essentially, these are assumptions based on personal recollections and a best guess of leakage upon removal of drums. As noted in Section 3.0 of this review, there is no reliable basis for these estimates. Therefore, evaluations of remedial actions in the FS are not based on reliable data. The quantity of liquids could vary by several orders of magnitude, depending on how many drums were buried, how many contained liquids, and how many have previously leaked. The soils in immediate contact with the waste can be expected to vary in a similar manner.

Generally, the cost of any on-site remediation effort is sensitive to quantities, due to capital costs, mobilization/demobilization, start-up, transportation charges, and (if applicable) permitting costs. No sensitivity analysis was conducted to show the variation in total alternative costs as a function of volume/number of waste/drums. In regard to operable Unit 2, there is again no reliable data showing the quantities involved. Without this information, it is not possible to accurately evaluate alternate technologies. In the case of this FS, only on-site and off-site incineration were evaluated. However, as noted herein, other technologies may also apply, and should be considered.

Validity of Incineration

The FS only evaluates two options in addition to no action: on-site and off-site incineration. While incineration is generally applicable to destruction of concentrated organics, it is not necessarily the most appropriate option for all the waste material and stained soil at the site. Neither the soil nor the drums are characterized to the degree necessary to assure acceptance by an off-site incinerator, or utilization of an on-site incinerator. The BTU values, moisture content, chloride concentrations, and volatile metals concentrations are largely undefined. These parameters will greatly affect the economics and technical feasibility of incineration.

The FS attempts to address this issue by requiring interim storage while the wastes are being characterized. However, there is no allowance other appropriate treatment technology or disposition other than by incineration based on the characterization results.

Waste Characteristics

The FS attempts to identify a technology (incineration) that will be applicable to direct treatment of all wastes on site. As noted in the previous section, there is insufficient characterization data available on source material. It is reported that the wastes were generally brought on-site in drums by truck over at least a two year period. The number, type, an identity of generators contributing to the site have not been established. It should be expected that wastes bought on-site over this long a time frame, and very possibly from multiple sources, will vary in content. Therefore, neither the drums nor the contaminated soil can be expected to be suitable for any single type of remedial technology. The lack of data makes it necessary either to conduct additional characterization efforts, or to design a remedial action program with sufficient flexibility to deal with varying waste types and quantities.

Other Potentially Viable Technologies

Although numerous technologies were screened in the FS, not all potential alternatives were considered. For example, in-situ volatilization can be used for removal of volatile organics as can low temperature thermal treatment. Also of potential use are extraction and stabilization. Stabilization was screened as an on-site process. However, this process can also be carried out at the point of disposal and eliminate potential fugitive dust problems at the site.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on a review of the Ewan Property Site RI/FS report the following conclusions were reached:

- An expedited response of drum removal on the basis of an imminent and substantial hazard to the public health and environment is not justified based on the information presented in the RI.
- The data base developed in the RI is not sufficient for the development and evaluation of remedial alternatives required in the FS.
- The alternatives which were developed cannot be adequately evaluated for selection of the most appropriate, cost effective, land protective remedial action for the site.

In order to address the issues outlined above the following steps should be taken:

- Further geophysics surveys using EM 31 and GPR should be conducted for definition and location of the trenches and associated buried drums. Also, test trenches uncovering larger areas of drums should be installed to allow for drum sampling, assessment of drum conditions, and determination of the amount of contaminated soils in relation to the number of drums and evaluation of dewatering techniques which may be required in a full-scale drum removal operation.
- If an interim remedial action of Operable Unit No. 1 is pursued there should be sufficient flexibility during remedial activities to allow for on-site decisions concerning the disposal of soil and waste material based on their chemical characteristics, physical properties, and quantities.
- An interim remedial action should also allow for future integration of the operable units, especially with respect to the disposition of other contaminated soils.

tlb